RANCH LINEAR PROGRAMMING · users manual

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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PREFACE

This manual provides guidance to users
of the Bureau of Land Management's Ranch
Linear Programming Model. The model is
used as an aid in analyzing the economic
impacts of Bureau programs on livestock
ranches with public land grazing
allotments. Please direct any comments
or suggestions to Fred Martinson, Denver
Service Center (DSC-441) or Dave Loomis,
Carson City District Office (NV-035).

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USERS MANUAL

RANCH LINEAR PROGRAMMING MODEL

Introduction

This users manual is designed to provide step by step instruction in the use
of the Bureau's ranch linear programing model. The model is intended for use
in analyzing the direct economic impacts of Bureau programs on livestock
ranches. It is particularly suited to analyze changes in the amount of
allowable livestock grazing use, changes in periods of allowable livestock
use, and changes in the cost of grazing on public lands.

This manual provides guidance only on the use of the model. It does not
provide guidance on baseline data collection, basic computer use, or community
level economic impact analysis. It is assumed that the user has these skills
or can obtain appropriate guidance.

Linear Programming

Linear programming (LP) is a mathematical technique for determining optimal
solutions to problems. It has been commonly used in range economics to
determine the size and type of livestock operations that will maximize profits
subject to a series of resource constraints - primarily limitations in the
amounts of various feed sources.

A simplified description of ranch LP analysis is that each program run begins
with a given number of livestock, selects the cheapest forage that is
available to feed the livestock (private pasture, public land forage,
purchased hay, etc.), adds the costs of supporting the livestock for a year,
and compares the total cost against the revenue gained from the sale of the
livestock. If the revenue is positive, the program continues by adding
additional livestock and repeating the process. Whenever the total yearly
costs exceed the sales revenue, that program run is rejected. The program
keeps track of the amount of forage used in each category each month (or
season); and when the maximum available level in a category is reached, only
forage from other categories enters into the solution.

For the economic analysis process, the analyst performs a base computer run of
the program to develop a model of a baseline ranch from which to determine the
impacts of changes in public land grazing management. The baseline ranch
model has the optimum levels of ranch resource use and livestock production,
given current conditions. The input data describing these conditions is then
altered to reflect the changes in grazing management to be analyzed and the
program is run again. This results in a description of the optimum level of
ranch inputs and outputs under the new set of conditions. The difference
between the baseline ranch description and the alternative ranch description
is the economic impact of the proposed changes in grazing management.

The model provides information on changes in ranch resource use, livestock production, herd size, and labor costs, in addition to information on dollar gains and/or losses. Sample runs highlighting these changes are displayed in the appendix.

Linear programming has four major weaknesses in terms of its ability to project ranch economic impacts. First, and most important, is that it is a simplified model of a ranch. No model can approach the complexities involved in running an actual ranch. Second, LP analysis generally is based on the assumption that ranchers always run their operations to maximize their profits. LP models are generally not well equipped to deal with non economic motives such as the desire to maintain a ranching lifestyle. Third, LP models are linear. They project no economies or diseconomies of scale regardless of ranch size. Fourth, they are generally static. That is they model ranches at a single point in time and are not well suited to a dynamic analysis of impacts over time.

Despite these weaknesses, LP analysis provides a consistent and scientifically accepted methodology for economic impact analysis. It is cost efficient, it can be prepared under short timeframes, and it is readily adaptable to the wide range of ranching operations occurring on public lands.

A detailed mathematical description of the model can be found in "A Linear Programming Model to Estimate the Economic Impacts of Changes in Federal Grazing Policies on Livestock Producers" by Fred Martinson and Judy Nelson. Copies can be obtained from DSC-441.

Users Guide

The Bureau's Ranch Linear Programming Model is an interactive computer system. That is, the user supplies direct on-line responses to a series of questions provided by the model. These questions are underlined below. Sample computer runs are included in the appendices.

The model is located on the Bureau's main frame Honeywell DPS-8 computer in the Denver Service Center.

To access the model enter: A121/JUDY/XRANCHLP

The computer will respond with:

1. IF INPUT DATA ARE ON FILE ENTER FILE NAME; ELSE PRESS THE RETURN KEY
   If your data file is already built enter the name here and skip to item 29 below.

If a new file is to be built the response will be:

2. ENTER PROBLEM NAME
   Up to 80 characters can be used.

3. MENU OF OPTIONS:
   1. COW-CALF
   2. SHEEP-LAMB
   3. MIXED OPERATION
   ENTER DESIRED OPTION
   In this section of the guide the cow-calf option will be discussed in detail. Annotated sample computer runs for sheep-lamb and mixed operations are displayed in the appendix. For cow-calf-yearling or cow-yearling operations, the cow-calf option should be selected. The program is not appropriate for straight yearling operations.

4. ENTER NO. OF COWS, PERCENT CALF CROP, PERCENT REPLACEMENT RATE, HEIFER CALF SALES, STEER CALF SALES, YEARLING DEATH LOSS, CULL DEATH LOSS AND NO. OF BULLS.
   Entries should be separated by commas. These entries are derived from the user's baseline data. Percent calf crop is equal to the number of calves weaned, i.e. calves born minus calf death loss. Percent replacement rate equals the percent of cows sold as culls; it does not include death loss for yearlings, replacements, or cows. Care must be taken in calculating calf sales. Proper provision must be made for replacements, death losses, and yearling sales, if any. The manner in which the program computes livestock numbers and sales is illustrated in the diagram on the following page. Two key items about the program need to be kept in mind: 1) The program truncates all percentage computations, and 2) if an uneven number of calves is calculated, the extra calf is entered as a steer. The last three entries - yearling and cow death losses and number of bulls are entered as the number of animals rather than as percentages or ratios.

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Figure A

Computation of Livestock Numbers and Sales

```
┌─────────────────────────────────────────┐
│ Calf Crop X # of Cows = # of Calves      │
└─────────────────────────────────────────┘
              │
      ┌───────────────────────┐
      │     # of Calves ÷ 2    │
      └───────────────────────┘
        ╱                    ╲
┌──────────────────┐   ┌──────────────────┐
│ Equals           │   │ Equals           │
│ # of Steer Calves│   │ # of Heifer Calves│
└──────────────────┘   └──────────────────┘
        │                      │
┌──────────────────┐   ┌──────────────────┐
│ Minus            │   │ Minus            │
│ Steer Calves Sold*│  │ Heifer Calves Sold*│
└──────────────────┘   └──────────────────┘
        │                      │
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Equals           │   │ Equals           │   │ # of Cows        │
│ Yearling Steers  │   │ Yearling Heifers │   │       X          │
└──────────────────┘   └──────────────────┘   │ Replacement Rate │
        │                      │               └──────────────────┘
                                                        │
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Minus            │   │ Minus            │   │ Plus             │
│ One Half         │   │ One Half         │   │ Cow Death Loss   │
│ Yearling Death Loss│ │ Yearling Death Loss│ └──────────────────┘
└──────────────────┘   └──────────────────┘            │
        │                      │
                       ┌──────────────────┐   ┌──────────────────┐
                       │ Minus            │   │ Equals           │
                       │ Replacement Heifers│─│ Replacement Heifers│
                       └──────────────────┘   └──────────────────┘
        │                      │
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Equals           │   │ Equals           │   │ Equals           │
│ Steer Yearlings  │   │ Heifer Yearlings │   │ Cull Cows        │
│ Sold*            │   │ Sold*            │   │ Sold*            │
└──────────────────┘   └──────────────────┘   └──────────────────┘
```
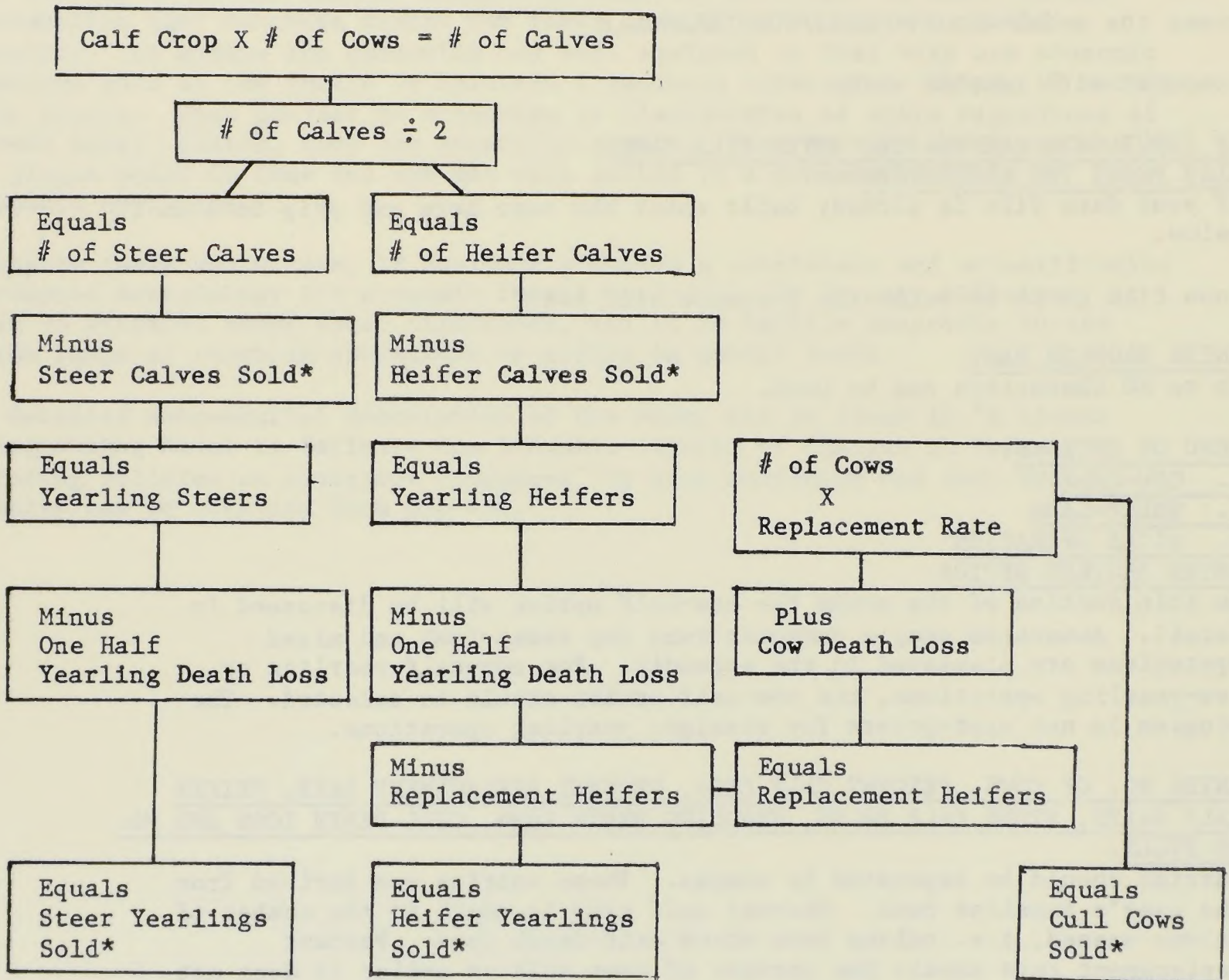
* = Program output
Boldface type is user input
Program truncates percentage computations
If an uneven number of calves is produced the excess calf is a steer.

5. ENTER CALVING CHOICE. CHOICES AVAILABLE ARE:
1. ALL CALVES ARE BORN IN ONE MONTH
2. CALVING EXTENDS BEYOND ONE MONTH
If option one is entered no further inputs are entered under this
category. If option two is selected the program will respond with:
ENTER PERCENT OF TOTAL CALF CROP BORN EACH OF THE 12 MONTHS
Twelve entries, separated by commas, must be made. Entries are percent
of calf crop and should therefore add to 100 percent. Percentage
computations for these entries are also truncated rather than rounded.
Calves are assumed to be born in the middle of the months specified.

6. ENTER MONTH OF BIRTH OF CALVES, MONTH OF SALE OF CALVES, MONTH OF SALE OF
YEARLINGS, AND MONTH OF SALE OF CULL COWS
The first entry is required only if option one above is selected. If
option two is selected only the last three entries are requested. Sales
are assumed to occur at the end of the month(s) specified. Calves must
be six months old before they are sold. After these data are entered
the program calculates the "steady state" ranch operation. It is steady
state because the number of replacements is just sufficient to maintain
a steady herd size. If any errors have been detected in the input data
the program will print an error message and return to Item #4 above.
The two error messages are: 1) NUMBER OF HEIFER (OR STEER) YEARLINGS
SOLD CANNOT BE LESS THAN 0. This means that the user entered too many
heifer (or steer) calf sales. The program interprets these as negative
yearling sales; 2) CALVES NOT OLD ENOUGH TO BE SOLD. This means
that the calf sales month entered is less than six months after the
birth month. If these errors are not detected the program will print:

7. THE DEFAULT ANIMAL UNIT EQUIVALENTS (AUE) ARE:

COWS	=	1.00
CALVES	=	0.40
REPL. HEIFERS	=	0.80
YEARLINGS	=	0.60
BULLS	=	1.25

DO YOU WANT TO OVERRIDE THE DEFAULT AUE VALUES?
(YES OR NO)

Animal unit equivalents (AUE) are required because BLM, for billing
purposes, calculates forage use as equal to one AUM per month for each
animal over six months of age, whereas actual forage requirements vary by
type and age of the animals. AUEs can vary greatly by region or by type
of operation, for example, short yearlings would have a lower AUE than
long yearlings. If data are available and differ from the default
values, they should be overridden.

8. ENTER NO. OF SOURCES OF FORAGE (EXCLUDING HAY) AND NO. OF GRAZING TIME
UNITS
The forage sources include BLM grazing as well as Forest Service,
private pasture, etc. No more than ten sources can be used. The entry
for grazing time units must be either '12' for months or '4' for
seasons.

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9. ENTER NO. OF BLM TIME PERIODS AND TIME PERIOD CODES
    These entries must correspond to the entry for the number of grazing time
    units. For example if monthly time units were selected and BLM forage is
    available in May, June, and July, the entry would be: 3,5,6,7. The
    first entry is the number of months and the following entries represent
    the months available. If forage is used during all grazing time units are
    used, only the number of time periods needs to be entered. For example, if
    monthlytime units were selected and BLM forage is available year round,
    then the entry would be: 12.

10. ENTER THE PREFERRED OPTION IN AVAILABLE BLM AUMS: (Y) BY YEAR, (S) BY
    SEASONS, (M) BY MONTHS
    This entry enables the user to limit available public land forage by year,
    season, or month. It is of particular importance when analyzing the
    impact of changes in seasonal (or monthly) forage availability. If
    seasons are specified the program will respond with:
    THE DEFAULT TIME PERIODS FOR EACH SEASON ARE:
    WINTER   1,2,3
    SPRING   4,5,6
    SUMMER   7,8,9
    FALL   10,11,12
    DO YOU WANT TO OVERRIDE THE DEFAULT VALUES (YES OR NO)
    This option enables the users to select the seasons of use most
    appropriate for their analysis.

    Next the program will request the limitations on public land forage use
    by year, season, or month. If seasons have been selected the prompt will
    be: ENTER BLM UPPER BOUNDS IN AUMS FOR WINTER, SPRING, SUMMER AND FALL.
    If the user is defining the ranch operation as it currently operates, these
    entries should be in terms of actual or licensed use rather than active
    preference.

11. ENTER FORAGE SOURCE NAME, NO. OF TIME PERIODS, TIME PERIOD CODES, AND
    UPPER BOUND IN AUMS
    The entries here are dependent on the entries in response to Item #8
    above. The program will ask for the number of forage sources specified in
    #8 minus one (for BLM forage) with a series of prompts (=). At each prompt
    the user responds with entries as follows: 1) A forage source name of
    eight characters or less, 2) The number of time periods that source is
    available. If "4" for seasons was entered in Item #8 then up to four
    seasons can be entered. If "12" for months was specified in Item #8 then
    up to 12 months can be entered, 3) The numeric codes for the time periods
    in which the forage source is available. These codes are one through 12
    corresponding to the appropriate months if months were selected in
    Item #8 or 1,2,3,4 corresponding to winter, spring, summer, and fall if
    seasons were selected in Item #8 above,and 4) Upper bound in AUMs. This
    entry equals the total number of AUMs available from each forage source.
    If the user is defining the ranch operation as it currently operates
    these entries should be in terms of actual use.

    For example, if months were specified in Item #8 and Forest Service grazing
    is used for three months; June, July, and August, for a total of 400 AUMs;
    the entry would be:
                    FORSERV,3,6,7,8,400

12. THE DEFAULT AUM VALUE OF HAY IS 4 AUMS/TON DO YOU WANT TO OVERRIDE THIS VALUE? (YES OR NO)

This entry allows the user to specify an appropriate AUM value for hay. This can vary greatly depending on local conditions and hay quality. An operation with larger than normal cows feeding low quality grass hay would likely have a lower AUM value than 4 AUMS/ton.

13. ENTER NO. OF HAY FEED TIME PERIODS AND TIME PERIOD CODES

These entries are also dependent on the entries in response to Item #8 and are analogous to responses 2) and 3) as outlined in Item 11. For example, if months were specified in Item #8 and hay is fed for five months: November, December, January, February, and March; the entry would be:
                    5,11,12,1,2,3

It should be noted that additional time periods may be used to allow for flexibility in responding to changes in other forage source uses.

14. ENTER NO. OF HAY SOURCES

The program allows up to four hay sources.

15. ENTER HAY SOURCE NAME, EXPECTED NO. OF TONS, AND UPPER BOUND IN TONS

Hay source names must be eight characters or less. The entry for expected (actual) tons used is included for the program to calculate per unit labor requirements. Upper bounds should equal expected use if the user is defining the ranch operation as it currently operates. The program is not structured for ranches that sell hay. These sales should be treated as separate operations. Since there is generally no practical limit for hay purchases the upper bound entry should be 9999.

16. ENTER NO. OF SOURCES OF LABOR AND NO. OF LABOR TIME UNITS

A maximum of two labor sources and up to 12 labor time periods can be selected. These time periods do not have to match months, seasons, or the time periods specified for forage use. For example the user could enter a "4" specifying four time periods representing: 1 – winter feeding period, 2 – calving period, 3 – summer grazing, and 4 – fall roundup. It should be noted that labor entries here are for livestock related operations only if separate data are available for hay labor. If no separate data are available, then labor entries here are for the whole operation.

17. ENTER CURRENT TOTAL LABOR HOURS FOR TIME PERIOD (#)

Entries are for labor hours from all sources for the appropriate time periods.

18. ENTER LABOR SOURCE NAME, NO. OF TIME PERIODS, AND TIME PERIOD CODES

The program will request entries for the number of labor sources specified in Item #16 above with prompts (=). Source names must be eight characters or less. The number of time periods must be less than or equal to the number of time units specified in Item #16. Time period codes must correspond to the time units specified in Item #16. For example if four labor time units were specified in Item #16 and hired labor is used during only one time period (the fall roundup which has code "4"), then the entry would be:
HIRED,1,4
If a labor source is used during all labor time units, only the labor source name and the number of time periods need to be entered . For example, if four time units were specified in Item #16, and hired labor is used in all four time periods, the entry would be:
HIRED,4.

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19. IS LABOR SOURCE XXXXX UPPER BOUNDED? (YES OR NO)
    The program will request a response for each labor source named in #18
    above. If the users response is yes the program will respond with:
    ENTER UPPER BOUND IN HOURS FOR LABOR SOURCE XXXXX AND TIME PERIOD (#)
    This entry permits the user to limit the number of hours available from
    each labor source during the time periods specified in Item #16 above.
    These upper bounds are for total labor hours available, including hay
    labor.

20. ENTER WEIGHT IN LBS FOR XXXXX
    The program will request entries for sales weights for heifer calves, steer
    calves, heifer yearlings, steer yearlings, and cull cows.

21. FOR HAY SOURCE XXXXX ANY LABOR ENTRIES? (YES OR NO)
    The program will request a response for each hay source specified in Item
    #15. A "YES" entry is appropriate only when separate data on hay labor
    are available. If the entry is "YES" the program will respond with:
    ENTER NUMBER OF HOURS OF CROP LABOR FOR HAY SOURCE XXXXX AND TIME
    PERIOD (#)
    Entries are for the hay sources specified in Item #15 and for the time
    periods designated for livestock labor requirements in Item #16.

22. COMMON FORAGE
    ENTER COST IN $/AUM, FOR FORAGE SOURCE XXXXX
    The program identifies all forage as common for cow-calf, sheep-lamb, and
    mixed operations with common forage as specified in Item #3. An entry
    will be requested for BLM and each forage source identified in Item #11.
    Entries should be non-labor costs directly attributable to each forage
    source such as grazing fees or private lease rates.

23. ENTER NON-LABOR COST IN $/AUM, OF FEEDING HAY
    This entry includes items such as repairs, maintenance, fuel and
    lubricants for trucks, tractors, trailers, etc. used to feed hay. If no
    separate data for these costs are available they should be included in
    Item # 27 below.

24. ENTER COST IN $/TON, OF HAY SOURCE XXXX
    The program will request per ton costs for each hay source identified in
    Item #15. These costs include price per ton of purchased hay and
    non-labor costs of hay grown on the ranch such as equipment, machinery and
    supplies costs.

25. ENTER COST, IN $/HR, FOR LABOR SOURCE XXXXX
    The program will request per hour costs for each labor source identified
    in Item #18. These entries should include not only wages and salaries but
    also employer paid unemployment insurance, social security, and fringe
    benefits if data are available.

26. ENTER PRICE IN $/CWT, FOR PRODUCT XXXXX
    The program will request per hundredweight prices received for heifer
    calves, steer calves, heifer yearlings, steer yearlings, and cull cows.

27. ENTER VARIABLE COST OF CATTLE OPERATION, IN $/COW
    This entry includes non-feed, non-labor short term variable costs only
    e.g., veterinary, trucking, marketing, fuel, lubricants, equipment
    repairs, interest on operating capital, salt, and supplements.

28. IF YOU WANT TO SAVE THE INPUT DATA ENTER FILE NAME; ELSE ENTER 'NO'
    This entry enables the user to save the input data for future use. A
    sample annotated file is displayed in the appendix.

29. DO YOU WANT TO SEE THE COMPUTED MATRIX COEFFICIENTS FOR THE 'AU' AND 'HAY
    SOURCES' COLUMNS? (YES OR NO)
    This entry enables the user to generate a printout of:
    1. Forage requirements per cow for the grazing time units entered in
       Item #8.
    2. Labor requirements in hours per AU for livestock and hours per
       AUM for hay for the labor time units specified in Item #16.
    3. Livestock production in terms of hundred weights sold per cow.

    An annotated printout of a sample of these entries is displayed
    in the appendix.

30. DO YOU WANT TO ENTER LOWER BOUNDS FOR HAY SOURCES (YES OR NO)
    This entry enables the user to force the model to produce or purchase hay
    even if it is inefficient to do so. This option was included in the
    program because LP analysis indicated that during the early 1980s
    ranchers were producing and/or purchasing more hay than market conditions
    would indicate would be economically efficient. With this option users are
    able to better describe livestock ranches as they currently operate.

31. Following the lower bound entries for hay, the program will enter the batch
    subsystem. It will print out a number of batch system messages. When the
    run is terminated it will print:
    JOUT INVOKED
    function?
    Enter 'RELE'

32. MODEL NAME
    DO YOU WANT TO SEE THE INPUT DATA? (YES OR NO)
    This entry enables the user to print the input data. An annotated
    printout of sample input data is displayed in the appendix. The ranch LP
    model output will be printed following the input data or in response to a
    "NO" entry for Item #32. Annotated printouts of sample outputs are
    displayed in the appendix.

Output Interpretation

The output of the ranch LP model displays the solution to the linear programming algorithm. It consists of three tables. This section briefly describes the content of those tables. Annotated printouts of sample outputs are displayed in the appendix.

Table One of the output displays all of the variables in the LP algorithm. These are feed sources by time period, hay sources, labor sources by time period, livestock production by animal produced for sale, and total cows produced. For each of these variables the output displays: X-VALUE, SHADOW PRICE, O.F. COEFF., LBOUND, UBOUND. The X-VALUE is the number of units used. The program assigns units among time periods in an arbitrary manner. For example, if the input data indicate that 100 AUMS of BLM forage are used in the summer, the program may arbitrarily assign all of this use to July. In such circumstances, the user should interpret the use as occurring throughout the summer. The SHADOW PRICE represents the relative loss that would result from the use of an additional unit of input. A positive number in this column means that the imputed value of the input used is greater than the value of the output produced. Since the program arbitrarily assigns input use among time periods, caution must be used in interpreting shadow prices. The O.F. COEFF. is the objective function co-efficient. Negative numbers represent the cost per unit of input. Positive numbers represent the prices received per unit of output. LBOUND indicates the lower bounds for hay sources entered in the input data. UBOUND indicates the upper bounds for hay and labor sources entered in the input data.

Table Two of the output displays the aggregated (not broken down by time units) forage sources (excluding hay). For each forage source it contains figures for L-VALUE, MARGINAL VALUE, and RHS. The L-VALUE indicates the number of units of each forage source that were available but were not used in the optional solution. The MARGINAL VALUE indicates the additional profit that could be made if an additional unit of a given input were available. The RHS (right hand side) value indicates the total amount of each forage source available as entered in the input data.

Following Table Two the program prints out the ratio between the actual number of cows entered in the input data and the nominal number of cows produced by the optimal solution to the LP algorithm. This ratio is used in analyzing the base run prior to impact analysis. If ratios of less than .90 or greater than 1.10 are calculated, the user should re-analyze the input data for inconsistencies.

Table Three of the output displays the budget summary for the optimal solution. It contains hundredweights produced, price per hundredweight, and total sales for each livestock category produced; a breakdown of total variable costs into feed, hay production, labor, and other categories; and net returns above variable costs.

Data Changes

When data are entered interactively, the program creates a computer file. The
program automatically saves the data file when the user specifies a name.

The user may wish to change the data to correct an erroneous value or to
determine the impact of alternative management changes. Two ways exist to
change the data without repeating the interactive data generation process.
These are described below:

    1. File Change Program (A121/JUDY/XCHANGE).

The data file can be changed using an auxiliary program called
A121/JUDY/XCHANGE. This is an interactive program that reacts similarly to
the ranch LP program. A list of data change options are presented in menu
format. The user selects the proposed change, and the program asks for the
new data. Additional changes may be made or the user can exit the program.
The file is saved when the user names it.

    2. Text Edit Mode.

The data file developed through the interactive program can be changed in the
text edit mode. The data in the file are in free format; hence, repeating the
exact spacing of the data is not important.

Annotated samples of the XCHANGE program and a cow-calf data file are
displayed in the appendix.

Appendix

Sample Program Runs

This appendix contains sample program base runs for cow-calf, ewe-lamb, and
mixed operations ranches, as well as a sample data file and a run of the
XCHANGE program with an impact run. Each of the runs is annotated where
appropriate. User inputs are in bold type and annotations are in brackets
([]). The cow-calf base run is annotated in detail. The other runs are
annotated only where they differ from the cow-calf run.

A121/JUDY/XRANCHLP

RANCH BUDGET MIXED L.P. MODEL

IF INPUT DATA ARE ON FILE ENTER FILE NAME;
ELSE PRESS THE CARRIAGE RETURN KEY
=(C/R)

ENTER PROBLEM NAME
=WALKER RESOURCE AREA CATTLE RANCH MODEL - 1982

MENU OF OPTIONS:
1.   COW-CALF
2.   SHEEP-LAMB
3.   MIXED OPERATION
ENTER DESIRED OPTION
=1

ENTER NO. OF COWS, PERCENT CALF CROP, PERCENT REPLACEMENT RATE,
HEIFER CALF SALES, STEER CALF SALES, YEARLING DEATH LOSS, CULL DEATH LOSS,
AND NO. OF BULLS
=510,79,9,146,200,1,10,39

ENTER CALVING CHOICE. CHOICES AVAILABLE ARE:
(1) ALL CALVES ARE BORN IN ONE MONTH
(2) CALVING EXTENDS BEYOND ONE MONTH
=2

ENTER PERCENT OF TOTAL CALF CROP BORN EACH OF THE 12 MONTHS
=0,0,33,34,33,0,0,0,0,0,0,0
[One third of the calves are born in March, April, and May]

ENTER MONTH OF SALE OF CALVES, MONTH OF SALE OF YEARLINGS
AND MONTH OF SALE OF CULL COWS
=12,12,11

THE DEFAULT ANIMAL UNIT EQUIVALENTS (AUE) ARE:
COWS   =   1.00
CALVES   =   0.40
REPL. HEIFERS=   0.80
YEARLINGS   =   0.60
BULLS   =   1.25
DO YOU WANT TO OVERRIDE THE DEFAULT AUE VALUES?(YES OR NO)
=YES
ENTER AUE FOR COWS
=1
ENTER AUE FOR CALVES
=.4
ENTER AUE FOR REPL. HEIFERS
=.8
ENTER AUE FOR YEARLINGS
=.65
ENTER AUE FOR BULLS
=1.33

```
ENTER NO. OF SOURCES OF FORAGE (EXCLUDING HAY)
AND NO. OF GRAZING TIME UNITS
=10,12

ENTER NO. OF BLM TIME PERIODS AND TIME PERIOD CODES
=12,1,2,3,4,5,6,7,8,9,10,11,12

ENTER PREFERRED OPTION IN AVAILABLE BLM AUMS:
(Y) BY YEAR, (S) BY SEASONS, (M) BY MONTHS
=S

THE DEFAULT TIME PERIODS FOR EACH SEASON ARE:
   WINTER    1, 2, 3
   SPRING    4, 5, 6
   SUMMER    7, 8, 9
   FALL     10,11,12
DO YOU WANT TO OVERRIDE THE DEFAULT VALUES? (YES OR NO)
=NO

ENTER BLM UPPER BOUNDS IN AUMS FOR WINTER,SPRING,SUMMER AND FALL
=905,344,192,106

ENTER FORAGE SOURCE NAME, NO. OF TIME PERIODS, TIME PERIOD CODES,
AND UPPER BOUND IN AUMS
=FEDSP,3,4,5,6,304              [In this example "FED" stands for other
                                Federal forage - Forest Service and BLM
=FEDSU,3,7,8,9,628              forage outside the study area.  Seasonal
                                availablilty was constrained by separating
=FEDWI,5,1,2,3,11,12,253        it into Spring, Summer, and Winter periods.]

=AFTER,3,10,11,12,277           [Aftermath grazing]

=LEASE,7,5,6,7,8,9,10,11,75     [Private grazing lease]

=RANGEYL,9,1,2,3,7,8,9,10,11,12,191 [Private rangeland used yearlong except
                                       in Spring]
=RANGESP,3,5,6,7,64               [Private rangeland available in Spring]

=PASTSP,1,6,435                   [Private pasture available in Spring]

=PASTSU,5,7,8,9,10,11,2173        [Private pasture available in Summer. Note that
                                    these seasons need not correspond to the BLM
                                    forage seasons]
THE DEFAULT AUM VALUE OF HAY IS 4 AUMS/TON
DO YOU WANT TO OVERRIDE THIS VALUE? (YES OR NO)
=YES

ENTER AUMS/TON OF HAY
=3.33

ENTER NO. OF HAY FEED TIME PERIODS AND TIME PERIOD CODES
=7,1,2,3,4,5,11,12

ENTER NO. OF HAY SOURCES
=2
```

14

ENTER HAY SOURCE NAME,EXPECTED NO. OF TONS, AND UPPER BOUND IN TONS
=GROW,530,530   [The base data for grass hay and alfalfa were
                              aggregated for this entry]
=BUY,0,9999   [The base data indicated no hay purchases, however this
                        option was included in the model since the ranchers could
                        purchase hay in response to BLM management changes.]
ENTER NO. OF SOURCES OF LABOR AND NO. OF LABOR TIME UNITS
=2,1   [The base data were aggregated - labor requirements are for
                        one time period - in hours per year.]
ENTER CURRENT TOTAL LABOR HOURS
FOR TIME PERIOD   1
=6028

ENTER LABOR SOURCE NAME, NO. OF TIME PERIODS, AND TIME PERIOD CODES
=FAMILY,1,1
=HIRED,1,1

IS LABOR SOURCE FAMILY   UPPER BOUNDED? (YES OR NO)
=YES
ENTER UPPER BOUND IN HRS
FOR LABOR SOURCE FAMILY   AND TIME PERIOD   1
=2697
IS LABOR SOURCE HIRED   UPPER BOUNDED? (YES OR NO)
=NO

ENTER WEIGHT IN LBS OF HCALVES
=465

ENTER WEIGHT IN LBS OF SCALVES
=465   [The base data used a combined weighted average weight for
                heifer and steer calves.]
ENTER WEIGHT IN LBS OF HYRLNGS
=465

ENTER WEIGHT IN LBS OF SYRLNGS
=465   [Entries are required even if no yearlings are sold.]

ENTER WEIGHT IN LBS OF CULLCOWS
=948

FOR HAY SOURCE GROW   ANY LABOR ENTRIES? (YES OR NO)
=YES

ENTER NO. OF HOURS OF CROP LABOR
FOR HAY SOURCE GROW   AND TIME PERIOD   1
=1536

FOR HAY SOURCE BUY   ANY LABOR ENTRIES? (YES OR NO)
=NO

COMMON FORAGE
ENTER COST, IN $/AUM, FOR FORAGE SOURCE BLM
=1.86   [Grazing fees were $1.86 per AUM in 1982.]
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FEDSP
=1.86

```
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FEDSU
=1.86
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FEDWI
=1.86
ENTER COST, IN $/AUM, FOR FORAGE SOURCE AFTER
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE LEASE
=6.8
ENTER COST, IN $/AUM, FOR FORAGE SOURCE RANGEYL
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE RANGESP
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE PASTSP
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE PASTSU
=0

ENTER (NON-LABOR) COST, IN $/AUM, OF FEEDING HAY
=0

ENTER COST, IN $/TON, OF HAY SOURCE GROW
=35
ENTER COST, IN $/TON, OF HAY SOURCE BUY
=88

ENTER COST, IN $/HR, FOR LABOR SOURCE FAMILY
=0                [Since the sample analysis was based on actual dollar costs
                  a $0 cost was entered for family labor. If the analysis
                  includes opportunity costs an imputed cost may be entered
                  here.]
ENTER COST, IN $/HR, FOR LABOR SOURCE HIRED
=5

ENTER PRICE, IN $/CWT, FOR PRODUCT HCALVES
=62
ENTER PRICE, IN $/CWT, FOR PRODUCT SCALVES
=62               [This is a weighted average price for heifer and steer
                  calves.]
ENTER PRICE, IN $/CWT, FOR PRODUCT HYRLNGS
=62               [Entries are required here even if no yearlings are sold.]

ENTER PRICE, IN $/CWT, FOR PRODUCT SYRLNGS
=62
ENTER PRICE, IN $/CWT, FOR PRODUCT CULLCOWS
=38

ENTER VARIABLE COST OF  CATTLE OPERATION, IN $/COW
=62

IF YOU WANT TO SAVE THE INPUT DATA ENTER FILE NAME;ELSE ENTER 'NO'
=WALKCSO          [File names must be eight characters or less.]

DO YOU WANT TO SEE THE COMPUTED MATRIX COEFFICIENTS
FOR THE 'AU' AND 'HAY SOURCES' COLUMNS? (YES OR NO)
=YES
```

AU COLUMN ENTRIES

CATTLE
FORAGE   1   1.2326   [These figures represent the forage requirements
FORAGE   2   1.2326   in AUMs for the entire herd on a per cow basis.
FORAGE   3   1.2326   For example , in June the entire operation
FORAGE   4   1.2326   including cows, calves, bulls, replacements and
FORAGE   5   1.2605   yearlings requires 1.2605 AUMs per cow.]
FORAGE   6   1.2605
FORAGE   7   1.2605
FORAGE   8   1.2605
FORAGE   9   1.2605
FORAGE   10   1.2605
FORAGE   11   1.3051
FORAGE   12   1.2478

CATTLE
LABOR   1   11.8196   [This figure indicates the hours of labor required
                                 per cow per year.]
HCALVES   1.331   [These figures indicate livestock production for
SCALVES   1.824   each category sold in terms of hundredweights
HYRLNGS   0.   per cow.]
SYRLNGS   0.
CULLCOWS   0.836

HAY SOURCE GROW   COLUMN ENTRIES
LABOR   1   0.8703   [This figure indicates the hours of labor required
                                 per ton of hay produced.]
HAY SOURCE BUY   COLUMN ENTRIES

DO YOU WANT TO ENTER LOWER BOUNDS FOR HAY SOURCES? (YES OR NO)
=YES

ENTER LOWER BOUND , IN TONS, FOR HAY SOURCE GROW
=430   [The base data indicated that of the 530 tons of hay produced,
                 430 were fed to livestock and 100 were sold. This entry forces
                 the model to produce 430 tons for livestock feed. Hay sales are
                 considered a seperate operation.]
ENTER LOWER BOUND , IN TONS, FOR HAY SOURCE BUY
=0

SNUMB 2767T
2767T -01   EXECUTING   @ 15.842
2767T OUTPUT WAITING   ID=   . @ 15.850
normal termination
JOUT INVOKED.
function?RELE
WALKER RESOURCE AREA CATTLE RANCH MODEL - 1982

DO YOU WANT TO SEE THE INPUT DATA? (YES OR NO)
=YES

INPUT DATA

LIVESTOCK	NO.	AUE
COWS	510	1.00
CALVES	402	0.40
REPL. HEIFERS	55	0.80
YEARLINGS	56	0.65
BULLS	39	1.33

PERCENT CALF CROP   =   79.0
PERCENT REPL. RATE =   9.0
HEIFER CALVES SOLD =   146
STEER CALVES SOLD =   200
DEATH LOSS (YRLNGS)=   1
DEATH LOSS (CULLS) =   10
MO. OF SALE OF CALVES   =   12
MO. OF SALE OF YEARLINGS=   12
MO. OF SALE OF CULL COWS=   11

STEADY STATE OPERATION

MONTH	CB	CS	COWS	CALVES	HEIFERS	YRLNGS	BULLS	FEED
1	0	0	510	56	55	0	39	628.6
2	0	0	510	56	55	0	39	628.6
3	132	132	510	56	55	0	39	628.6
4	136	136	510	56	55	0	39	628.6
5	132	76	510	0	55	56	39	642.9
6	0	0	510	0	55	56	39	642.9
7	0	0	510	0	55	56	39	642.9
8	0	0	510	0	55	56	39	642.9
9	0	0	510	0	55	56	39	642.9
10	0	0	510	0	55	56	39	642.9
11	0	0	510	56	55	56	39	665.6
12	0	0	510	56	55	11	39	636.4

TOTAL AUMS REQUIRED   7673.6

[The section above describes the steady state operation as entered in the
input data. Column CB displays the number of calves born by month. Column CS
displays the number of calves born in those months they were eventually sold.
Note that of the 132 calves born in May only 76 were eventually sold. The
remaining 56 were retained for replacements. These were not included in the
CALVES column untill November when they were weaned. They were calculated as
calves from November through May when they became yearlings. At the end of
November, 45 cull cows were sold – these were replaced by 45 replacements from
the HEIFERS (two year olds) column. These were replaced by 45 heifers from the
YRLNGS column. At the end of December ten cows died – these were replaced by
ten replacements from the HEIFERS column which were replaced by ten heifers
from the YRLINGS column. The remaining yearling heifer died. The FEED column
displays total feed requirements by month.]

AU SALES
HEIFER CALVES   =   146
STEER CALVES   =   200
HEIFER YEARLINGS=   0
STEER YEARLINGS =   0
CULL COWS   =   45

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FORAGE

SOURCES	1	2	3	4	5	6	7	8	9	10	11	12	UPPER BOUNDS,AUMS
BLM	1	2	3	4	5	6	7	8	9	10	11	12	
FEDSP				4	5	6							304
FEDSU							7	8	9				628
FEDWI	1	2	3								11	12	253
AFTER										10	11	12	277
LEASE					5	6	7	8	9	10	11		75
RANGEYL	1	2	3				7	8	9	10	11	12	191
RANGESP					5	6	7						64
PASTSP						6							435
PASTSU							7	8	9	10	11		2173
HAYFEED	1	2	3	4	5						11	12	

BLM SEASONAL CONSTRAINTS

SEASON	TIME PERIODS			UPPER BOUNDS,AUMS
WIN	1	2	3	905
SPR	4	5	6	344
SUM	7	8	9	192
FLL	10	11	12	106

HAY

SOURCES	LOWER	UPPER	LABOR?	XPECTD TONS	CROP LABOR,HRS(PER TIME PERIOD)
GROW	430	530	YES	530	1536
BUY	0	9998	NO	0	0

AUMS/TON OF HAY =   3.33

LABOR

TIME PERIOD	CURRENT HRS	UPPER BOUNDS,HRS	
		FAMILY	HIRED
1	6028	2697	99999

LIVESTOCK

PRODUCTS	WEIGHT,LBS
HCALVES	465
SCALVES	465
HYRLNGS	465
SYRLNGS	465
CULLCOWS	948

COST COEFFICIENTS

		UNITS
BLM	1.86	$/AUM
FEDSP	1.86	$/AUM
FEDSU	1.86	$/AUM
FEDWI	1.86	$/AUM
AFTER	0.	$/AUM
LEASE	6.80	$/AUM
RANGEYL	0.	$/AUM
RANGESP	0.	$/AUM
PASTSP	0.	$/AUM
PASTSU	0.	$/AUM
HAYFEED	0.	$/AUM
GROW	35.00	$/TON
BUY	88.00	$/TON
FAMILY	0.	$/HR
HIRED	5.00	$/HR

HCALVES		62.00	$/CWT			
SCALVES		62.00	$/CWT			
HYRLNGS		62.00	$/CWT			
SYRLNGS		62.00	$/CWT			
CULLCOWS		38.00	$/CWT			
VAR. CATTLE COST		62.00	$/COW			

RESULTS

OPTIMUM PROFIT = $ 38733.86

VARIABLE		UNITS	X-VALUE	SHADOW PRICE	O.F. COEFF.	LBOUND	UBOUND
BLM	1	AUMS	413.483	0.	-1.860		
BLM	2	AUMS	0.	0.	-1.860		
BLM	3	AUMS	491.517	0.	-1.860		

[The three rows above indicate that 413.483 AUMs of BLM forage were used in
January, zero were used in February, and 491.517 were used in March. However,
since the model assigns use among months arbitrarily, the proper
interpretation is that 905 AUMs were used during the winter period.]

VARIABLE		UNITS	X-VALUE	SHADOW PRICE	O.F. COEFF.	LBOUND	UBOUND
BLM	4	AUMS	0.	0.	-1.860		
BLM	5	AUMS	344.000	0.	-1.860		
BLM	6	AUMS	0.	0.	-1.860		
BLM	7	AUMS	0.	0.	-1.860		
BLM	8	AUMS	192.000	0.	-1.860		
BLM	9	AUMS	0.	0.	-1.860		
BLM	10	AUMS	106.000	0.	-1.860		
BLM	11	AUMS	0.	0.	-1.860		
BLM	12	AUMS	0.	0.	-1.860		
FEDSP	4	AUMS	0.	0.	-1.860		
FEDSP	5	AUMS	184.835	0.	-1.860		
FEDSP	6	AUMS	119.165	0.	-1.860		
FEDSU	7	AUMS	0.	0.	-1.860		
FEDSU	8	AUMS	9.835	0.	-1.860		
FEDSU	9	AUMS	618.165	0.	-1.860		
FEDWI	1	AUMS	0.	0.	-1.860		
FEDWI	2	AUMS	239.300	0.	-1.860		
FEDWI	3	AUMS	0.	0.	-1.860		
FEDWI	11	AUMS	13.700	0.	-1.860		
FEDWI	12	AUMS	0.	0.	-1.860		
AFTER	10	AUMS	0.	0.	0.		
AFTER	11	AUMS	0.	0.	0.		
AFTER	12	AUMS	277.000	0.	0.		
LEASE	5	AUMS	75.000	0.	-6.800		
LEASE	6	AUMS	0.	0.	-6.800		
LEASE	7	AUMS	0.	0.	-6.800		
LEASE	8	AUMS	0.	0.	-6.800		
LEASE	9	AUMS	0.	0.	-6.800		
LEASE	10	AUMS	0.	0.	-6.800		
LEASE	11	AUMS	0.	0.	-6.800		
RANGEYL	1	AUMS	191.000	0.	0.		
RANGEYL	2	AUMS	0.	0.	0.		
RANGEYL	3	AUMS	0.	0.	0.		
RANGEYL	7	AUMS	0.	0.	0.		
RANGEYL	8	AUMS	0.	0.	0.		
RANGEYL	9	AUMS	0.	0.	0.		
RANGEYL	10	AUMS	0.	0.	0.		

RANGEYL	11	AUMS	0.	0.	0.	
RANGEYL	12	AUMS	0.	0.	0.	
RANGESP	5	AUMS	0.	0.	0.	
RANGESP	6	AUMS	64.000	0.	0.	
RANGESP	7	AUMS	0.	0.	0.	
PASTSP	6	AUMS	435.000	0.	0.	
PASTSU	7	AUMS	618.165	0.	0.	
PASTSU	8	AUMS	416.331	0.	0.	
PASTSU	9	AUMS	0.	0.	0.	
PASTSU	10	AUMS	512.165	0.	0.	
PASTSU	11	AUMS	626.338	0.	0.	
HAYFEED	1	AUMS	0.	0.	0.	
HAYFEED	2	AUMS	365.183	0.	0.	
HAYFEED	3	AUMS	112.966	0.	0.	
HAYFEED	4	AUMS	604.483	0.	0.	
HAYFEED	5	AUMS	14.331	0.	0.	
HAYFEED	11	AUMS	0.	0.	0.	
HAYFEED	12	AUMS	334.937	0.	0.	
GROW		AUMS	1431.900	7.798	-10.510	1432. 1765.
BUY		AUMS	0.	19.363	-26.426	0. 33297.
FAMILY	1	HRS	2697.000	-5.000	0.	2697.
HIRED	1	HRS	4345.667	0.	-5.000	99999.
HCALVES		CWT	652.838	0.	62.000	
SCALVES		CWT	894.268	0.	62.000	
HYRLNGS		CWT	0.	0.	62.000	
SYRLNGS		CWT	0.	0.	62.000	
CULLCOWS		CWT	410.230	0.	38.000	
COWS		AU	490.413	0.	-62.000	

ROW		UNITS	L-VALUE	MARGINAL VALUE	RHS
BLM	WIN	AUMS	0.	5.204	905.000

[The row above indicates than all avalilable BLM winter forage is used (the
L-VALUE = 0). The MARGINAL VALUE column entry indicates that an additional
AUM fo BLM winter forage would increase profits by $5.204. The RHS column
diplays current available AUMs from the input data.]

BLM	SPR	AUMS	0.	5.204	344.000
BLM	SUM	AUMS	0.	5.204	192.000
BLM	FLL	AUMS	0.	5.204	106.000
FEDSP		AUMS	0.	5.204	304.000
FEDSU		AUMS	0.	5.204	628.000
FEDWI		AUMS	0.	5.204	253.000
AFTER		AUMS	0.	7.064	277.000
LEASE		AUMS	0.	0.264	75.000
RANGEYL		AUMS	0.	7.064	191.000
RANGESP		AUMS	0.	7.064	64.000
PASTSP		AUMS	0.	7.064	435.000
PASTSU		AUMS	0.	7.064	2173.000

[If, for the base run, the L-VALUE column has a significant number of AUMs,
the user should reanalyze the input data. Such large numbers of unused AUMs
in the base model will result in underestimating the impacts of decreasing
public land forage because the model will compensate by utilizing those AUMs
in the alternative program runs.]

ACTUAL COWS/NOMINAL COWS RATIO = 0.96

BUDGET SUMMARY FOR WALKER RESOURCE AREA CATTLE RANCH MODEL - 1982
FOR HERD OF   490.41 COWS

LIVESTOCK	CWT	$/CWT	SALES,$
HCALVES	652.838	62.00	40475.94
SCALVES	894.268	62.00	55444.61
HYRLNGS	0.	62.00	0.
SYRLNGS	0.	62.00	0.
CULLCOWS	410.230	38.00	15588.76

GROSS REVENUE   111509.31

VARIABLE COSTS
  FEED   5591.52
  HAY MGT   15049.98
  LABOR   21728.34
  OTHER   30405.60

TOTAL VARIABLE COSTS   72775.44

NET ABOVE VARIABLE COSTS   38733.86
FILE RELEASED-MPSOUT

A121/JUDY/XRANCHLP

RANCH BUDGET MIXED L.P. MODEL

IF INPUT DATA ARE ON FILE ENTER FILE NAME;
ELSE PRESS THE CARRIAGE RETURN KEY
=(cr)
ENTER PROBLEM NAME
=WALKER RESOURCE AREA SHEEP RANCH MODEL - 1982

MENU OF OPTIONS:
1.   COW-CALF
2.   SHEEP-LAMB
3.   MIXED OPERATION
ENTER DESIRED OPTION
=2

ENTER NO. OF EWES, PERCENT LAMB CROP, PERCENT REPLACEMENT RATE,
PERCENT LAMB LOSS DOCKING TO MARKET, PERCENT EWE LOSS,
AND NO. OF EWES PER RAM
=6625,99,19,5,5,39
[For this entry the number of ewes is from the base data. Percent lamb crop is
the number of lambs expressed as a percentage of the number of ewes. Percent
replacement rate equals the percent of ewes sold as culls. Percent lamb loss
is the percent of lambs lost between docking and sales. Percent ewe loss is
the number of ewes and yearling replacements lost expressed as a percentage of
the number of ewes. In other words, while the number of animals lost includes
ewes and replacements, this entry is calculated as a percentage of ewes in the
base herd only - excluding replacements. The computation routine used to
determine the number of animals sold is diagrammed on the following page.]

ENTER LAMBING CHOICE.   CHOICES AVAILABLE ARE:
(1)   ALL LAMBS ARE BORN IN ONE MONTH
(2)   LAMBING EXTENDS BEYOND ONE MONTH
=2

ENTER PERCENT OF TOTAL LAMB CROP BORN EACH OF THE 12 MONTHS
=0,0,50,50,0,0,0,0,0,0,0,0

ENTER MONTH OF SALE OF LAMBS AND MONTH OF SALE OF CULL EWES
=10,10

THE DEFAULT ANIMAL UNIT EQUIVALENTS (AUE) ARE:
EWES   =   0.20
LAMBS   =   0.
REPL. EWES   =   0.20
RAMS   =   0.20
DO YOU WANT TO OVERRIDE THE DEFAULT AUE VALUES?(YES OR NO)
=YES
ENTER AUE FOR EWES
=.23
ENTER AUE FOR LAMBS
=.06
ENTER AUE FOR REPL. EWES
=.22
ENTER AUE FOR RAMS
=.25

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Figure B

Computation of Sheep Numbers and Sales
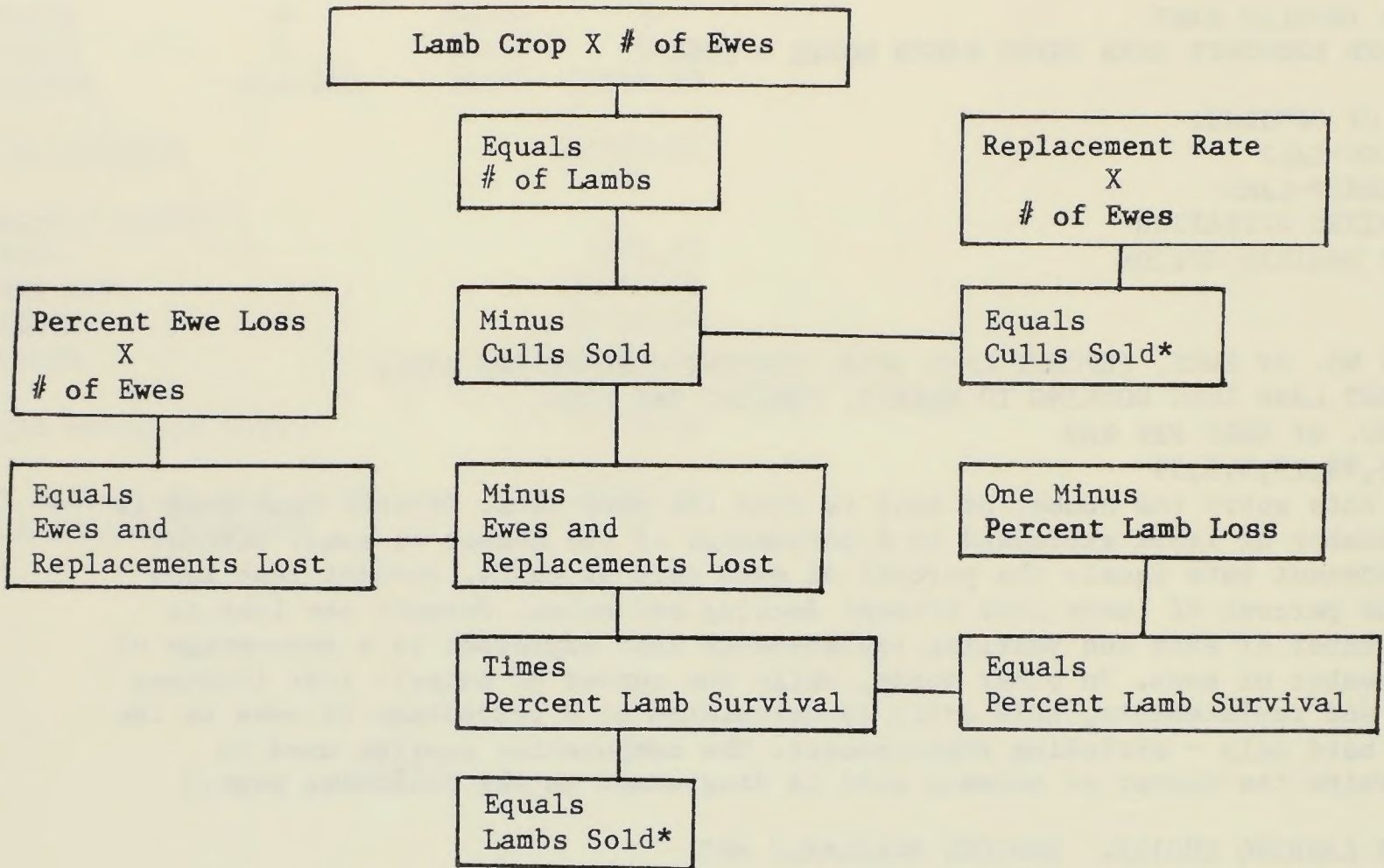
```
                 ┌─────────────────────────────┐
                 │   Lamb Crop X # of Ewes      │
                 └─────────────────────────────┘
                              │
                 ┌─────────────────────┐        ┌─────────────────────┐
                 │ Equals              │        │ Replacement Rate    │
                 │ # of Lambs          │        │        X            │
                 │                     │        │     # of Ewes       │
                 └─────────────────────┘        └─────────────────────┘
                              │                           │
┌──────────────────┐  ┌─────────────────┐    ┌─────────────────────┐
│ Percent Ewe Loss │  │ Minus           │    │ Equals              │
│        X         │  │ Culls Sold      │────│ Culls Sold*         │
│    # of Ewes     │  │                 │    │                     │
└──────────────────┘  └─────────────────┘    └─────────────────────┘
         │                     │
┌──────────────────┐  ┌─────────────────┐    ┌─────────────────────┐
│ Equals           │  │ Minus           │    │ One Minus           │
│ Ewes and         │──│ Ewes and        │    │ Percent Lamb Loss   │
│ Replacements Lost│  │ Replacements    │    │                     │
│                  │  │ Lost            │    │                     │
└──────────────────┘  └─────────────────┘    └─────────────────────┘
                              │                           │
                      ┌─────────────────┐    ┌─────────────────────┐
                      │ Times           │    │ Equals              │
                      │ Percent Lamb    │────│ Percent Lamb        │
                      │ Survival        │    │ Survival            │
                      └─────────────────┘    └─────────────────────┘
                              │
                      ┌─────────────────┐
                      │ Equals          │
                      │ Lambs Sold*     │
                      └─────────────────┘
```

* = Program output
Boldface type is user input.
Program truncates percentage computations.

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```
ENTER NO. OF SOURCES OF FORAGE (EXCLUDING HAY)
AND NO. OF GRAZING TIME UNITS
=10,12

ENTER NO. OF BLM TIME PERIODS AND TIME PERIOD CODES
=9,1,2,3,4,5,6,7,8,9

ENTER PREFERRED OPTION IN AVAILABLE BLM AUMS:
(Y) BY YEAR, (S) BY SEASONS, (M) BY MONTHS
=S

THE DEFAULT TIME PERIODS FOR EACH SEASON ARE:
   WINTER   1, 2, 3
   SPRING   4, 5, 6
   SUMMER   7, 8, 9
   FALL    10,11,12
DO YOU WANT TO OVERRIDE THE DEFAULT VALUES? (YES OR NO)
=NO

ENTER BLM UPPER BOUNDS IN AUMS FOR WINTER,SPRING,SUMMER AND FALL
=1248,599,786,0

ENTER FORAGE SOURCE NAME, NO. OF TIME PERIODS, TIME PERIOD CODES,
AND UPPER BOUND IN AUMS
=FEDWI,3,1,2,3,1248
=FEDSP,3,4,5,6,1297
=FEDSU,3,7,8,9,3059
=FEDFA,3,10,11,12,844
=LEASE,4,1,10,11,12,1183
=PASTSU,3,7,8,9,2429
=PASTFA,3,10,11,12,3693
=RANGESP,3,4,5,6,656
=RANGEYL,9,1,2,3,7,8,9,10,11,12,1969

THE DEFAULT AUM VALUE OF HAY IS 4 AUMS/TON
DO YOU WANT TO OVERRIDE THIS VALUE? (YES OR NO)
=YES

ENTER AUMS/TON OF HAY
=3.33

ENTER NO. OF HAY FEED TIME PERIODS AND TIME PERIOD CODES
=7,1,2,3,4,5,11,12

ENTER NO. OF HAY SOURCES
=2

ENTER HAY SOURCE NAME,EXPECTED NO. OF TONS, AND UPPER BOUND IN TONS
=GROW,1502,1502
=BUY,0,9999
ENTER NO. OF SOURCES OF LABOR AND NO. OF LABOR TIME UNITS
=2,1

ENTER CURRENT TOTAL LABOR HOURS
FOR TIME PERIOD    1
=27534
```

25

ENTER LABOR SOURCE NAME, NO. OF TIME PERIODS, AND TIME PERIOD CODES
=FAMILY,1,1
=HIRED,1,1

IS LABOR SOURCE FAMILY   UPPER BOUNDED? (YES OR NO)
=YES
ENTER UPPER BOUND IN HRS
FOR LABOR SOURCE FAMILY   AND TIME PERIOD   1
=9360
IS LABOR SOURCE HIRED   UPPER BOUNDED? (YES OR NO)
=NO

ENTER WEIGHT IN LBS OF SLAMBS   [These entries are for slaughter
=89   lambs and feeder lambs. Since the
ENTER WEIGHT IN LBS OF FLAMBS   data base for this sample run did
=89   not distinguish between the two,
                                                 identical weights were entered.]
ENTER WEIGHT IN LBS OF CULLEWES
=100
ENTER LBS OF FLEECE WEIGHT PER SHEEP   [This entry should be for grease or
=10.2   shearing weight.]

ENTER RATIO OF SLAUGHTER TO FEEDER LAMBS   [This entry allows the user to
=0   distinguish between slaughter and
                                            feeder lambs. An entry of "0" will
                                            produce all feeders.]
FOR HAY SOURCE GROW   ANY LABOR ENTRIES? (YES OR NO)
=YES

ENTER NO. OF HOURS OF CROP LABOR
FOR HAY SOURCE GROW   AND TIME PERIOD   1
=3003

FOR HAY SOURCE BUY   ANY LABOR ENTRIES? (YES OR NO)
=NO

COMMON FORAGE
ENTER COST, IN $/AUM, FOR FORAGE SOURCE BLM
=1.86
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FEDWI
=1.86
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FEDSP
=1.86
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FEDSU
=1.86
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FEDFA
=1.86
ENTER COST, IN $/AUM, FOR FORAGE SOURCE LEASE
=4.5
ENTER COST, IN $/AUM, FOR FORAGE SOURCE PASTSU
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE PASTFA
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE RANGESP
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE RANGEYL
=0

```
ENTER (NON-LABOR) COST, IN $/AUM, OF FEEDING HAY
=0
ENTER COST, IN $/TON, OF HAY SOURCE GROW
=33
ENTER COST, IN $/TON, OF HAY SOURCE BUY
=88

ENTER COST, IN $/HR, FOR LABOR SOURCE FAMILY
=0
ENTER COST, IN $/HR, FOR LABOR SOURCE HIRED
=5

ENTER PRICE, IN $/CWT, FOR PRODUCT SLAMBS
=46
ENTER PRICE, IN $/CWT, FOR PRODUCT FLAMBS
=46
ENTER PRICE, IN $/CWT, FOR PRODUCT CULLEWES
=15
ENTER PRICE, IN $/LB, FOR PRODUCT WOOL
=.77
ENTER WOOL INCENTIVE PAYMENT, IN $/LB               [Incentive and unshorn
=.57                                                 lamb payments should be
                                                     adjusted to reflect
ENTER UNSHORN LAMB PAYMENTS, IN $/CWT OF LAMB SOLD   deductions for wool
=2.62                                                promotion.]

ENTER VARIABLE COST OF   SHEEP   OPERATION, IN $/EWE
=9.11

IF YOU WANT TO SAVE THE INPUT DATA ENTER FILE NAME;
ELSE ENTER 'NO'
=WALKS1

DO YOU WANT TO SEE THE COMPUTED MATRIX COEFFICIENTS
FOR THE 'AU' AND 'HAY SOURCES' COLUMNS? (YES OR NO)
=NO

DO YOU WANT TO ENTER LOWER BOUNDS FOR HAY SOURCES? (YES OR NO)
=YES

ENTER LOWER BOUND , IN TONS, FOR HAY SOURCE GROW
=1502
ENTER LOWER BOUND , IN TONS, FOR HAY SOURCE BUY
=0

SNUMB 2309T
2309T -01   WAIT-ALOC     @ 11.550
2309T -01   WAIT-PERIP    @ 11.554
2309T -01   WAIT CORE     @ 11.555
2309T -01   EXECUTING     @ 11.556..
2309T -01   TERMINATING   @ 11.580
2309T OUTPUT WAITING    ID=V2. @ 11.582
normal termination

JOUT INVOKED.
function?RELE
```

WALKER RESOURCE AREA SHEEP RANCH MODEL - 1982

DO YOU WANT TO SEE THE INPUT DATA? (YES OR NO)
=YES

INPUT DATA

LIVESTOCK	NO.	AUE
EWES	6625	0.23
LAMBS	6558	0.06
REPL. EWES	1589	0.22
RAMS	169	0.25

PERCENT LAMB CROP = 99.0
PERCENT REPL. RATE = 19.0
PERCENT LAMB LOSS =   5.0
PERCENT EWE LOSS   =   5.0
NO. OF EWES PER RAM= 39.0
MO. OF SALE OF LAMBS   =   10
MO. OF SALE OF CULL EWES=   10

STEADY STATE OPERATION

MONTH	LB	LS	EWES	LAMBS	YRLNGS	RAMS	FEED
1	0	0	6625	1589	0	169	1661.4
2	0	0	6625	1589	0	169	1661.4
3	3279	3279	6625	1589	0	169	1661.4
4	3279	1689	6625	0	1589	169	1915.7
5	0	0	6625	0	1589	169	1915.7
6	0	0	6625	0	1589	169	1915.7
7	0	0	6625	0	1589	169	1915.7
8	0	0	6625	0	1589	169	1915.7
9	0	0	6625	0	1589	169	1915.7
10	0	0	6625	1589	1589	169	2011.1
11	0	0	6625	1589	0	169	1661.4
12	0	0	6625	1589	0	169	1661.4

TOTAL AUMS REQUIRED   21812.5

AU SALES
SLAUGHTER LAMBS =   0
FEEDER LAMBS   =   4720
CULL EWES   =   1258

FORAGE

SOURCES	TIME PERIODS												UPPER BOUNDS,AUMS
BLM	1	2	3	4	5	6	7	8	9				
FEDWI	1	2	3										1248
FEDSP				4	5	6							1297
FEDSU							7	8	9				3059
FEDFA										10	11	12	844
LEASE	1									10	11	12	1183
PASTSU							7	8	9				2429
PASTFA										10	11	12	3693
RANGESP				4	5	6							656
RANGEYL	1	2	3				7	8	9	10	11	12	1969
HAYFEED	1	2	3	4	5						11	12	

```
BLM SEASONAL CONSTRAINTS
SEASON     TIME PERIODS      UPPER BOUNDS,AUMS
WIN          1   2   3          1248
SPR          4   5   6           599
SUM          7   8   9           786
FLL         10  11  12             0

HAY             BOUNDS,TONS
SOURCES  LOWER       UPPER   LABOR?  XPECTD TONS  CROP LABOR,HRS(PER TIME PERIOD)
GROW     1502        1502    YES          1502    3003
BUY         0        9998    NO              0       0

AUMS/TON OF HAY =      3.33

LABOR
TIME PERIOD   CURRENT HRS  UPPER BOUNDS,HRS
                           FAMILY    HIRED
         1       27534      9360    99999

LIVESTOCK
PRODUCTS     WEIGHT,LBS
SLAMBS         89
FLAMBS         89
CULLEWES      100

WOOL SALES
WOOL (LBS)           = 69298
WOOL INCENTIVE ($/LB)=  0.57
UNSHORN LAMB ($/CWT) =  2.62

COST COEFFICENTS            UNITS
BLM                 1.86    $/AUM
FEDWI               1.86    $/AUM
FEDSP               1.86    $/AUM
FEDSU               1.86    $/AUM
FEDFA               1.86    $/AUM
LEASE               4.50    $/AUM
PASTSU              0.      $/AUM
PASTFA              0.      $/AUM
RANGESP             0.      $/AUM
RANGEYL             0.      $/AUM
HAYFEED             0.      $/AUM
GROW               33.00    $/TON
BUY                88.00    $/TON
FAMILY              0.      $/HR
HIRED               5.00    $/HR
SLAMBS             48.62    $/CWT
FLAMBS             48.62    $/CWT
CULLEWES           15.00    $/CWT
WOOL                1.34    $/LB
VAR. SHEEP COST     9.11    $/EWE

RESULTS

OPTIMUM PROFIT = $        89852.07
```

VARIABLE		UNITS	X-VALUE	SHADOW PRICE	O.F. COEFF.	LBOUND	UBOUND
BLM	1	AUMS	0.	0.	-1.860		
BLM	2	AUMS	602.904	0.	-1.860		
BLM	3	AUMS	645.096	0.	-1.860		
BLM	4	AUMS	0.	0.	-1.860		
BLM	5	AUMS	443.104	0.	-1.860		
BLM	6	AUMS	155.896	0.	-1.860		
BLM	7	AUMS	0.	0.	-1.860		
BLM	8	AUMS	786.000	0.	-1.860		
BLM	9	AUMS	0.	0.	-1.860		
FEDWI	1	AUMS	64.220	0.	-1.860		
FEDWI	2	AUMS	0.	0.	-1.860		
FEDWI	3	AUMS	1183.780	0.	-1.860		
FEDSP	4	AUMS	0.	0.	-1.860		
FEDSP	5	AUMS	0.	0.	-1.860		
FEDSP	6	AUMS	1297.000	0.	-1.860		
FEDSU	7	AUMS	0.	0.	-1.860		
FEDSU	8	AUMS	1322.896	0.	-1.860		
FEDSU	9	AUMS	1736.104	0.	-1.860		
FEDFA	10	AUMS	0.	0.	-1.860		
FEDFA	11	AUMS	844.000	0.	-1.860		
FEDFA	12	AUMS	0.	0.	-1.860		
LEASE	1	AUMS	1183.000	0.	-4.500		
LEASE	10	AUMS	0.	0.	-4.500		
LEASE	11	AUMS	0.	0.	-4.500		
LEASE	12	AUMS	0.	0.	-4.500		
PASTSU	7	AUMS	2108.896	0.	0.		
PASTSU	8	AUMS	0.	0.	0.		
PASTSU	9	AUMS	320.104	0.	0.		
PASTFA	10	AUMS	879.247	0.	0.		
PASTFA	11	AUMS	984.876	0.	0.		
PASTFA	12	AUMS	1828.876	0.	0.		
RANGESP	4	AUMS	0.	0.	0.		
RANGESP	5	AUMS	0.	0.	0.		
RANGESP	6	AUMS	656.000	0.	0.		
RANGEYL	1	AUMS	581.657	0.	0.		
RANGEYL	2	AUMS	0.	0.	0.		
RANGEYL	3	AUMS	0.	0.	0.		
RANGEYL	7	AUMS	0.	0.	0.		
RANGEYL	8	AUMS	0.	0.	0.		
RANGEYL	9	AUMS	52.687	0.	0.		
RANGEYL	10	AUMS	1334.656	0.	0.		
RANGEYL	11	AUMS	0.	0.	0.		
RANGEYL	12	AUMS	0.	0.	0.		
HAYFEED	1	AUMS	0.	0.	0.		
HAYFEED	2	AUMS	1225.973	0.	0.		
HAYFEED	3	AUMS	0.	0.	0.		
HAYFEED	4	AUMS	2108.896	0.	0.		
HAYFEED	5	AUMS	1665.792	0.	0.		
HAYFEED	11	AUMS	0.	0.	0.		
HAYFEED	12	AUMS	0.	0.	0.		
GROW		AUMS	5000.660	7.505	-9.910	5002.	5002.
BUY		AUMS	0.	21.019	-26.426	0.	33297.
FAMILY	1	HRS	9360.000	-5.000	0.		9360.
HIRED	1	HRS	23949.387	0.	-5.000		99999.

SLAMBS	CWT	0.	0.	48.620
FLAMBS	CWT	4623.966	0.	48.620
CULLEWES	CWT	1384.783	0.	15.000
WOOL	LBS	76277.565	0.	1.340
EWES	AU	7292.171	0.	-9.110

ROW		UNITS	L-VALUE	MARGINAL VALUE	RHS
BLM	WIN	AUMS	0.	3.547	1248.000
BLM	SPR	AUMS	0.	3.547	599.000
BLM	SUM	AUMS	0.	3.547	786.000
BLM	FLL	AUMS	0.	0.	0.
FEDWI		AUMS	0.	3.547	1248.000
FEDSP		AUMS	0.	3.547	1297.000
FEDSU		AUMS	0.	3.547	3059.000
FEDFA		AUMS	0.	3.547	844.000
LEASE		AUMS	0.	0.907	1183.000
PASTSU		AUMS	0.	5.407	2429.000
PASTFA		AUMS	0.	5.407	3693.000
RANGESP		AUMS	0.	5.407	656.000
RANGEYL		AUMS	0.	5.407	1969.000

ACTUAL EWES/NOMINAL EWES RATIO = 1.10
BUDGET SUMMARY FOR WALKER RESOURCE AREA SHEEP RANCH MODEL – 1982
FOR HERD OF   7292.17 EWES

LIVESTOCK	CWT	$/CWT	SALES,$
SLAMBS	0.	48.62	0.
FLAMBS	4623.966	48.62	224817.20
CULLEWES	1384.783	15.00	20771.75
WOOL	76277.565	1.34	102211.94

[Wool quantity is expressed in pounds rather than hundredweights.]

GROSS REVENUE		347800.89
VARIABLE COSTS		
FEED		22214.16
HAY MGT		49556.04
LABOR		119746.93
OTHER		66431.68
TOTAL VARIABLE COSTS		257948.81
NET ABOVE VARIABLE COSTS		89852.08

FILE RELEASED-MPSOUT

A121/JUDY/XRANCHLP

RANCH BUDGET MIXED L.P. MODEL

IF INPUT DATA ARE ON FILE ENTER FILE NAME;
ELSE PRESS THE CARRIAGE RETURN KEY
=(cr)
ENTER PROBLEM NAME
=ROBERTS/NEWMIX9

MENU OF OPTIONS:
1. COW-CALF
2. SHEEP-LAMB
3. MIXED OPERATION
ENTER DESIRED OPTION
=3

ENTER NO. OF COWS, PERCENT CALF CROP, PERCENT REPLACEMENT RATE,
HEIFER CALF SALES, STEER CALF SALES, YEARLING DEATH LOSS, CULL DEATH LOSS,
AND NO. OF BULLS
=129,90,10,43,57,1,3,12

ENTER CALVING CHOICE.   CHOICES AVAILABLE ARE:
(1) ALL CALVES ARE BORN IN ONE MONTH
(2) CALVING EXTENDS BEYOND ONE MONTH
=2

ENTER PERCENT OF TOTAL CALF CROP BORN EACH OF THE 12 MONTHS
=0,0,40,60,0,0,0,0,0,0,0,0

ENTER MONTH OF SALE OF CALVES, MONTH OF SALE OF YEARLINGS
AND MONTH OF SALE OF CULL COWS
=10,10,10

THE DEFAULT ANIMAL UNIT EQUIVALENTS (AUE) ARE:
COWS   = 1.00
CALVES   = 0.40
REPL. HEIFERS= 0.80
YEARLINGS   = 0.60
BULLS   = 1.25
DO YOU WANT TO OVERRIDE THE DEFAULT AUE VALUES?(YES OR NO)
=NO
ENTER NO. OF EWES, PERCENT LAMB CROP, PERCENT REPLACEMENT RATE,
PERCENT LAMB LOSS DOCKING TO MARKET, PERCENT EWE LOSS,AND NO. OF EWES PER RAM
=1963,119,20,9,5,50

ENTER LAMBING CHOICE.   CHOICES AVAILABLE ARE:
(1) ALL LAMBS ARE BORN IN ONE MONTH
(2) LAMBING EXTENDS BEYOND ONE MONTH
=2

ENTER PERCENT OF TOTAL LAMB CROP BORN EACH OF THE 12 MONTHS
=0,0,30,70,0,0,0,0,0,0,0,0

ENTER MONTH OF SALE OF LAMBS AND MONTH OF SALE OF CULL EWES
=10,10

32

```
THE DEFAULT ANIMAL UNIT EQUIVALENTS (AUE) ARE:
EWES           =  0.20
LAMBS          =  0.
REPL. EWES     =  0.20
RAMS           =  0.20
DO YOU WANT TO OVERRIDE THE DEFAULT AUE VALUES?(YES OR NO)
=NO


GRAZING MODES FOR A MIXED OPERATION:
1.   CATTLE AND SHEEP ON THE SAME RANGE
2.   CATTLE AND SHEEP ON SEPARATE RANGES
3.   COMBINATION OF 1 AND 2
ENTER DESIRED MODE              [This entry provides for a ranch which raises
=3                                both  cattle and sheep and for which cattle and
                                  sheep are grazed partly on the same ranges
COMMON SOURCES OF FORAGE        (common forage) and partly on seperate ranges.]

ENTER NO. OF SOURCES OF FORAGE (EXCLUDING HAY)AND NO. OF GRAZING TIME UNITS
=3,12

ENTER NO. OF BLM TIME PERIODS AND TIME PERIOD CODES
=10,1,2,3,4,5,6,7,8,9,12                           [For this sample run, BLM,
                                                    private, and seeded range are
ENTER PREFERRED OPTION IN AVAILABLE BLM AUMS:       grazed by both sheep and
(Y) BY YEAR, (S) BY SEASONS, (M) BY MONTHS          cattle; Forest Service is
=Y                                                  grazed by cattle only; and
                                                    hay aftermath is grazed by
ENTER UPPER BOUND IN AUMS FOR BLM FORAGE            sheep only.]
=2800

ENTER FORAGE SOURCE NAME, NO. OF TIME PERIODS, TIME PERIOD CODES,
AND UPPER BOUND IN AUMS
=PRIVATE,6,5,6,7,8,9,10,1400
=SEEDED,7,4,5,6,7,8,9,10,1000

CATTLE SOURCES OF FORAGE

ENTER NO. OF SOURCES OF FORAGE (EXCLUDING HAY)AND NO. OF GRAZING TIME UNITS
=2,12                                              [Even though there is
                                                    only one forage source
ENTER NO. OF BLM TIME PERIODS AND TIME PERIOD CODES used only by cattle
=1,1                                                (Forest Service), two
                                                    sources were entered
ENTER PREFERRED OPTION IN AVAILABLE BLM AUMS:       here. BLM is always the
(Y) BY YEAR, (S) BY SEASONS, (M) BY MONTHS          first forage source. If
=Y                                                  no BLM forage is used a
                                                    "0" upper bound should
ENTER UPPER BOUND IN AUMS FOR BLM FORAGE            be entered.]
=0

ENTER FORAGE SOURCE NAME, NO. OF TIME PERIODS, TIME PERIOD CODES,AND UPPER
BOUND IN AUMS

=FOREST,5,5,6,7,8,9,710
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SHEEP  SOURCES OF FORAGE

ENTER NO. OF SOURCES OF FORAGE (EXCLUDING HAY)AND NO. OF GRAZING TIME UNITS
=2,12

ENTER NO. OF BLM TIME PERIODS AND TIME PERIOD CODES
=1,1

ENTER PREFERRED OPTION IN AVAILABLE BLM AUMS:
(Y) BY YEAR, (S) BY SEASONS, (M) BY MONTHS
=Y

ENTER UPPER BOUND IN AUMS FOR BLM FORAGE
=0

ENTER FORAGE SOURCE NAME, NO. OF TIME PERIODS, TIME PERIOD CODES,
AND UPPER BOUND IN AUMS
=AFTERMAT,1,9,350

THE DEFAULT AUM VALUE OF HAY IS 4 AUMS/TON
DO YOU WANT TO OVERRIDE THIS VALUE? (YES OR NO)
=YES

ENTER AUMS/TON OF HAY
=3

ENTER NO. OF HAY FEED TIME PERIODS AND TIME PERIOD CODES
=6,1,2,3,4,11,12

ENTER NO. OF HAY SOURCES
=2

ENTER HAY SOURCE NAME,EXPECTED NO. OF TONS, AND UPPER BOUND IN TONS
=BARLEY,256,300
=HAY,1000,1250

ENTER NO. OF SOURCES OF LABOR AND NO. OF LABOR TIME UNITS
=3,4

ENTER CURRENT TOTAL LABOR HOURS
FOR TIME PERIOD      1
=2000
FOR TIME PERIOD      2
=3000
FOR TIME PERIOD      3
=3000
FOR TIME PERIOD      4
=2000

ENTER RATIO OF TOTAL CATTLE LABOR HRS TO TOTAL SHEEP LABOR HRS
=.25

ENTER LABOR SOURCE NAME, NO. OF TIME PERIODS, AND TIME PERIOD CODES
=FAMILY,4,1,2,3,4
=HERDER,4,1,2,3,4
=HIRED,4,1,2,3,4
```

34

```
IS LABOR SOURCE FAMILY   UPPER BOUNDED? (YES OR NO)
=YES
ENTER UPPER BOUND IN HRS
FOR LABOR SOURCE FAMILY   AND TIME PERIOD   1
=600
FOR LABOR SOURCE FAMILY   AND TIME PERIOD   2
=700
FOR LABOR SOURCE FAMILY   AND TIME PERIOD   3
=700
FOR LABOR SOURCE FAMILY   AND TIME PERIOD   4
=500

IS LABOR SOURCE HERDER   UPPER BOUNDED? (YES OR NO)
=YES
ENTER UPPER BOUND IN HRS
FOR LABOR SOURCE HERDER   AND TIME PERIOD   1
=800
FOR LABOR SOURCE HERDER   AND TIME PERIOD   2
=800
FOR LABOR SOURCE HERDER   AND TIME PERIOD   3
=800
FOR LABOR SOURCE HERDER   AND TIME PERIOD   4
=800

IS LABOR SOURCE HIRED    UPPER BOUNDED? (YES OR NO)
=NO

ENTER WEIGHT IN LBS OF HCALVES
=433
ENTER WEIGHT IN LBS OF SCALVES
=448
ENTER WEIGHT IN LBS OF HYRLNGS
=750
ENTER WEIGHT IN LBS OF SYRLNGS
=800
ENTER WEIGHT IN LBS OF CULLCOWS
=988
ENTER WEIGHT IN LBS OF SLAMBS
=95
ENTER WEIGHT IN LBS OF FLAMBS
=84
ENTER WEIGHT IN LBS OF CULLEWES
=115
ENTER LBS OF FLEECE WEIGHT PER SHEEP
=10.4

ENTER RATIO OF SLAUGHTER TO FEEDER LAMBS
=1

FOR HAY SOURCE BARLEY   ANY LABOR ENTRIES? (YES OR NO)
=YES
ENTER NO. OF HOURS OF CROP LABOR
FOR HAY SOURCE BARLEY    AND TIME PERIOD   1
=0
FOR HAY SOURCE BARLEY   AND TIME PERIOD   2
=100
```

```
FOR HAY SOURCE BARLEY    AND TIME PERIOD   3
=300
FOR HAY SOURCE BARLEY    AND TIME PERIOD   4
=0

FOR HAY SOURCE HAY       ANY LABOR ENTRIES? (YES OR NO)
=YES
ENTER NO. OF HOURS OF CROP LABOR
FOR HAY SOURCE HAY       AND TIME PERIOD   1
=0
FOR HAY SOURCE HAY       AND TIME PERIOD   2
=300
FOR HAY SOURCE HAY       AND TIME PERIOD   3
=400
FOR HAY SOURCE HAY       AND TIME PERIOD   4
=0

COMMON FORAGE
ENTER COST, IN $/AUM, FOR FORAGE SOURCE BLM
=1.35
ENTER COST, IN $/AUM, FOR FORAGE SOURCE PRIVATE
=0
ENTER COST, IN $/AUM, FOR FORAGE SOURCE SEEDED
=.5

CATTLE FORAGE
ENTER COST, IN $/AUM, FOR FORAGE SOURCE BLM
=1.35
ENTER COST, IN $/AUM, FOR FORAGE SOURCE FOREST
=1.35

SHEEP  FORAGE
ENTER COST, IN $/AUM, FOR FORAGE SOURCE BLM
=1.35
ENTER COST, IN $/AUM, FOR FORAGE SOURCE AFTERMAT
=0

ENTER (NON-LABOR) COST, IN $/AUM, OF FEEDING HAY
=1

ENTER COST, IN $/TON, OF HAY SOURCE BARLEY
=78.54
ENTER COST, IN $/TON, OF HAY SOURCE HAY
=35

ENTER COST, IN $/HR, FOR LABOR SOURCE FAMILY
=0
ENTER COST, IN $/HR, FOR LABOR SOURCE HERDER
=4.5
ENTER COST, IN $/HR, FOR LABOR SOURCE HIRED
=3.55

ENTER PRICE, IN $/CWT, FOR PRODUCT HCALVES
=58.3
ENTER PRICE, IN $/CWT, FOR PRODUCT SCALVES
=58.3
```

```
ENTER PRICE, IN $/CWT, FOR PRODUCT HYRLNGS
=65.5
ENTER PRICE, IN $/CWT, FOR PRODUCT SYRLNGS
=65.5
ENTER PRICE, IN $/CWT, FOR PRODUCT CULLCOWS
=34.7
ENTER PRICE, IN $/CWT, FOR PRODUCT SLAMBS
=53
ENTER PRICE, IN $/CWT, FOR PRODUCT FLAMBS
=53
ENTER PRICE, IN $/CWT, FOR PRODUCT CULLEWES
=20
ENTER PRICE, IN $/LB, FOR PRODUCT WOOL
=.82
ENTER WOOL INCENTIVE PAYMENT, IN $/LB
=.55
ENTER UNSHORN LAMB PAYMENTS, IN $/CWT OF LAMB SOLD
=1.2

ENTER VARIABLE COST OF   CATTLE OPERATION, IN $/COW
=50.56
ENTER VARIABLE COST OF   SHEEP  OPERATION, IN $/EWE
=42.35

IF YOU WANT TO SAVE THE INPUT DATA ENTER FILE NAME;ELSE ENTER 'NO'
=LPROBM1

DO YOU WANT TO SEE THE COMPUTED MATRIX COEFFICIENTS
FOR THE 'AU' AND 'HAY SOURCES' COLUMNS? (YES OR NO)
=NO

DO YOU WANT TO ENTER LOWER BOUNDS FOR HAY SOURCES? (YES OR NO)
=NO

SNUMB 2393T
2393T READING RMT  @ 11.964
2393T EXECUTING    @ 11.964
2393T -01   WAIT-ALOC    @ 11.970
2393T -01   EXECUTING    @ 11.975..
2393T -01   TERMINATING  @ 11.999
2393T OUTPUT WAITING    ID=V2. @ 12.004
normal termination

JOUT INVOKED.
function?RELE

ROBERTS/NEWMIX9

DO YOU WANT TO SEE THE INPUT DATA? (YES OR NO)
=YES
```

```
INPUT DATA

LIVESTOCK            NO.      AUE

COWS                 129     1.00
CALVES               116     0.40
REPL. HEIFERS         15     0.80
YEARLINGS             16     0.60
BULLS                 12     1.25

PERCENT CALF CROP   =   90.0
PERCENT REPL. RATE  =   10.0
HEIFER CALVES SOLD  =     43
STEER CALVES SOLD   =     57
DEATH LOSS (YRLNGS) =      1
DEATH LOSS (CULLS)  =      3

MO. OF SALE OF CALVES    =    10
MO. OF SALE OF YEARLINGS =    10
MO. OF SALE OF CULL COWS =    10

STEADY STATE OPERATION
```

MONTH	CB	CS	COWS	CALVES	HEIFERS	YRLNGS	BULLS	FEED
1	0	0	129	16	15	0	12	162.4
2	0	0	129	16	15	0	12	162.4
3	46	46	129	16	15	0	12	162.4
4	69	53	129	0	15	16	12	165.7
5	0	0	129	0	15	16	12	165.7
6	0	0	129	0	15	16	12	165.7
7	0	0	129	0	15	16	12	165.7
8	0	0	129	0	15	16	12	165.7
9	0	0	129	0	15	16	12	165.7
10	0	0	129	16	15	16	12	172.1
11	0	0	129	16	15	0	12	162.4
12	0	0	129	16	15	0	12	162.4

```
TOTAL AUMS REQUIRED                                        1978.3

AU SALES

HEIFER CALVES     =    43
STEER CALVES      =    57
HEIFER YEARLINGS  =     0
STEER YEARLINGS   =     0
CULL COWS         =    12

LIVESTOCK            NO.      AUE

EWES                1963     0.20
LAMBS               2335     0.
REPL. EWES           490     0.20
RAMS                  39     0.20
```

```
PERCENT LAMB CROP  = 119.0
PERCENT REPL. RATE =  20.0
PERCENT LAMB LOSS  =   9.0
PERCENT EWE LOSS   =   5.0
NO. OF EWES PER RAM=  50.0

MO. OF SALE OF LAMBS    =    10
MO. OF SALE OF CULL EWES=    10
```

STEADY STATE OPERATION

MONTH	LB	LS	EWES	LAMBS	YRLNGS	RAMS	FEED
1	0	0	1963	490	0	39	400.4
2	0	0	1963	490	0	39	400.4
3	700	700	1963	490	0	39	400.4
4	1635	1144	1963	0	490	39	498.6
5	0	0	1963	0	490	39	498.6
6	0	0	1963	0	490	39	498.6
7	0	0	1963	0	490	39	498.6
8	0	0	1963	0	490	39	498.6
9	0	0	1963	0	490	39	498.6
10	0	0	1963	490	490	39	498.6
11	0	0	1963	490	0	39	400.4
12	0	0	1963	490	0	39	400.4

TOTAL AUMS REQUIRED   5492.2

AU SALES

```
SLAUGHTER LAMBS =    839
FEEDER LAMBS    =    839
CULL EWES       =    392
```

COMMON FORAGE
SOURCES	TIME PERIODS											UPPER BOUNDS,AUMS
BLM	1	2	3	4	5	6	7	8	9		12	2800
PRIVATE					5	6	7	8	9	10		1400
SEEDED				4	5	6	7	8	9	10		1000
HAYFEED	1	2	3	4							11 12	

CATTLE FORAGE
SOURCES	TIME PERIODS								UPPER BOUNDS,AUMS
BLM	1								0
FOREST					5	6	7	8 9	710
HAYFEED	1	2	3	4				11 12	

SHEEP FORAGE
SOURCES	TIME PERIODS				UPPER BOUNDS,AUMS
BLM	1				0
AFTERMAT				9	350
HAYFEED	1 2 3 4			11 12	

```
HAY              BOUNDS,TONS
SOURCES  LOWER        UPPER  LABOR?  XPECTD TONS  CROP LABOR,HRS(PER TIME
PERIOD)

BARLEY       0         300   YES             256    0   100   300     0
HAY          0        1250   YES            1000    0   300   400     0

AUMS/TON OF HAY =      3.00
LABOR
TIME PERIOD  CURRENT HRS  UPPER BOUNDS,HRS
                          FAMILY   HERDER    HIRED
          1      2000       600      800     99999
          2      3000       700      800     99999
          3      3000       700      800     99999
          4      2000       500      800     99999

RATIO OF TOTAL CATTLE LABOR HRS TO TOTAL SHEEP LABOR HRS =  0.25

LIVESTOCK
PRODUCTS     WEIGHT,LBS

HCALVES       433
SCALVES       448
HYRLNGS       750
SYRLNGS       800
CULLCOWS      988

LIVESTOCK
PRODUCTS     WEIGHT,LBS

SLAMBS         95
FLAMBS         84
CULLEWES      115

WOOL SALES

WOOL (LBS)           = 20820
WOOL INCENTIVE ($/LB)=  0.55
UNSHORN LAMB ($/CWT) =  1.20

COST COEFFICIENTS         UNITS

COMMON FORAGE
BLM              1.35    $/AUM
PRIVATE          0.      $/AUM
SEEDED           0.50    $/AUM

CATTLE FORAGE
BLM              1.35    $/AUM
FOREST           1.35    $/AUM

SHEEP  FORAGE
BLM              1.35    $/AUM
AFTERMAT         0.      $/AUM
HAYFEED          1.00    $/AUM
```

40

BARLEY		78.54	$/TON				
HAY		35.00	$/TON				
FAMILY		0.	$/HR				
HERDER		4.50	$/HR				
HIRED		3.55	$/HR				
HCALVES		58.30	$/CWT				
SCALVES		58.30	$/CWT				
HYRLNGS		65.50	$/CWT				
SYRLNGS		65.50	$/CWT				
CULLCOWS		34.70	$/CWT				
SLAMBS		54.20	$/CWT				
FLAMBS		54.20	$/CWT				
CULLEWES		20.00	$/CWT				
WOOL		1.37	$/LB				
VAR. CATTLE COST		50.56	$/COW				
VAR. SHEEP COST		42.35	$/EWE				

RESULTS

OPTIMUM PROFIT = $ 18167.57

VARIABLE		UNITS	X-VALUE	SHADOW PRICE	O.F. COEFF.	LBOUND	UBOUND
COMMON FORAGE							
CATTLE							
BLM	1	AUMS	147.203	0.	-1.350		
BLM	2	AUMS	147.203	0.	-1.350		
BLM	3	AUMS	147.203	0.	-1.350		
BLM	4	AUMS	150.125	0.	-1.350		
BLM	5	AUMS	0.	0.	-1.350		
BLM	6	AUMS	0.	0.	-1.350		
BLM	7	AUMS	0.	0.	-1.350		
BLM	8	AUMS	0.	0.	-1.350		
BLM	9	AUMS	0.	0.	-1.350		
BLM	12	AUMS	147.203	0.	-1.350		
PRIVATE	5	AUMS	0.	0.	0.		
PRIVATE	6	AUMS	40.626	0.	0.		
PRIVATE	7	AUMS	0.	0.	0.		
PRIVATE	8	AUMS	0.	0.	0.		
PRIVATE	9	AUMS	0.	0.	0.		
PRIVATE	10	AUMS	155.959	0.	0.		
SEEDED	4	AUMS	0.	0.	-0.500		
SEEDED	5	AUMS	0.	0.	-0.500		
SEEDED	6	AUMS	0.	0.	-0.500		
SEEDED	7	AUMS	0.	0.	-0.500		
SEEDED	8	AUMS	0.	0.	-0.500		
SEEDED	9	AUMS	0.	0.	-0.500		
SEEDED	10	AUMS	0.	0.	-0.500		

```
SHEEP
BLM         1    AUMS     362.897      0.        -1.350
BLM         2    AUMS     362.897      0.        -1.350
BLM         3    AUMS     362.897      0.        -1.350
BLM         4    AUMS       0.         0.        -1.350
BLM         5    AUMS     152.110      0.        -1.350
BLM         6    AUMS       0.         0.        -1.350
BLM         7    AUMS     355.526      0.        -1.350
BLM         8    AUMS       0.         0.        -1.350
BLM         9    AUMS     101.842      0.        -1.350
BLM        12    AUMS     362.897      0.        -1.350
PRIVATE     5    AUMS     299.732      0.         0.
PRIVATE     6    AUMS     451.842      0.         0.
PRIVATE     7    AUMS       0.         0.         0.
PRIVATE     8    AUMS       0.         0.         0.
PRIVATE     9    AUMS       0.         0.         0.
PRIVATE    10    AUMS     451.842      0.         0.
SEEDED      4    AUMS     451.842      0.        -0.500
SEEDED      5    AUMS       0.         0.        -0.500
SEEDED      6    AUMS       0.         0.        -0.500
SEEDED      7    AUMS      96.316      0.        -0.500
SEEDED      8    AUMS     451.842      0.        -0.500
SEEDED      9    AUMS       0.         0.        -0.500
SEEDED     10    AUMS       0.         0.        -0.500
CATTLE FORAGE
BLM         1    AUMS       0.         0.        -1.350
FOREST      5    AUMS     150.125      0.        -1.350
FOREST      6    AUMS     109.499      0.        -1.350
FOREST      7    AUMS     150.125      0.        -1.350
FOREST      8    AUMS     150.125      0.        -1.350
FOREST      9    AUMS     150.125      0.        -1.350

SHEEP   FORAGE
BLM         1    AUMS       0.         0.        -1.350
AFTERMAT    9    AUMS     350.000      0.         0.

CATTLE FORAGE
HAYFEED     1    AUMS       0.        11.174     -1.000
HAYFEED     2    AUMS       0.        11.174     -1.000
HAYFEED     3    AUMS       0.        11.174     -1.000
HAYFEED     4    AUMS       0.        11.174     -1.000
HAYFEED    11    AUMS     147.203      0.        -1.000
HAYFEED    12    AUMS       0.        11.174     -1.000

SHEEP   FORAGE
HAYFEED     1    AUMS       0.        11.174     -1.000
HAYFEED     2    AUMS       0.        11.174     -1.000
HAYFEED     3    AUMS       0.        11.174     -1.000
HAYFEED     4    AUMS       0.        11.174     -1.000
HAYFEED    11    AUMS     362.897      0.        -1.000
HAYFEED    12    AUMS       0.        11.174     -1.000
```

BARLEY		AUMS	0.	15.534	-26.180	0.	900.
HAY		AUMS	510.099	0.	-11.667	0.	3750.
FAMILY	1	HRS	600.000	-3.550	0.		600.
FAMILY	2	HRS	700.000	-3.550	0.		700.
FAMILY	3	HRS	700.000	-3.550	0.		700.
FAMILY	4	HRS	500.000	-3.550	0.		500.
HERDER	1	HRS	0.	0.950	-4.500		800.
HERDER	2	HRS	0.	0.950	-4.500		800.
HERDER	3	HRS	0.	0.950	-4.500		800.
HERDER	4	HRS	0.	0.950	-4.500		800.
HIRED	1	HRS	1212.474	0.	-3.550		99999.
HIRED	2	HRS	2069.633	0.	-3.550		99999.
HIRED	3	HRS	2086.619	0.	-3.550		99999.
HIRED	4	HRS	1312.474	0.	-3.550		99999.
HCALVES		CWT	168.724	0.	58.300		
SCALVES		CWT	231.407	0.	58.300		
HYRLNGS		CWT	0.	0.	65.500		
SYRLNGS		CWT	0.	0.	65.500		
CULLCOWS		CWT	107.444	0.	34.700		
SLAMBS		CWT	722.235	0.	54.200		
FLAMBS		CWT	638.627	0.	54.200		
CULLEWES		CWT	408.437	0.	20.000		
WOOL		LBS	18868.135	0.	1.370		
COWS		AU	116.902	0.	-50.560		
EWES		AU	1778.905	0.	-42.350		
ROW		UNITS	L-VALUE	MARGINAL VALUE	RHS		

COMMON FORAGE

BLM	AUMS	0.	0.971	2800.000
PRIVATE	AUMS	0.	2.321	1400.000
SEEDED	AUMS	0.	1.821	1000.000

CATTLE FORAGE

BLM	AUMS	0.	0.971	0.
FOREST	AUMS	0.	0.971	710.000

SHEEP FORAGE

BLM	AUMS	0.	0.971	0.
AFTERMAT	AUMS	0.	2.321	350.000

ACTUAL COWS/NOMINAL COWS RATIO = 0.91

ACTUAL EWES/NOMINAL EWES RATIO = 0.91

43

```
BUDGET SUMMARY FOR ROBERTS/NEWMIX9
FOR HERD OF     116.90 COWS AND   1778.91 EWES

LIVESTOCK           CWT      $/CWT    SALES,$

HCALVES          168.724    58.30    9836.62
SCALVES          231.407    58.30   13491.03
HYRLNGS             0.      65.50       0.
SYRLNGS             0.      65.50       0.
CULLCOWS         107.444    34.70    3728.32

SLAMBS           722.235    54.20   39145.16
FLAMBS           638.627    54.20   34613.58
CULLEWES         408.437    20.00    8168.73

WOOL           18868.135     1.37   25849.34

GROSS REVENUE                      134832.79

VARIABLE COSTS
   CATTLE FEED                       2103.27
   SHEEP  FEED                       3645.33
   HAY MGT                           5951.18
   LABOR                            23718.26
   OTHER                            81247.18

TOTAL VARIABLE COSTS               116665.22

NET ABOVE VARIABLE COSTS            18167.57
FILE RELEASED-MPSOUT
```

OLD WALKCSO

*LIST

WALKER RESOURCE AREA CATTLE RANCH MODEL -
1982

      1   [Ranch type option.]

 510   79.   9. 146 200   1 10 39
[No. of cows, calf crop, replacement rate, hcalf sales, scalf sales, yrlng,
 death loss, cull death loss, no. of bulls.]

    2   [Calving option.]

   0.   0. 33. 34. 33.   0.   0.   0.   0.   0.   0.   0.
[Monthly calf crop.]

  12   12   11   [Livestock sales months.]

YES   [AUE option.]

    1.00   [Cow AUE.]
    0.40   [Calf AUE.]
    0.80   [Repl. AUE.]
    0.65   [Yrlng. AUE.]
    1.33   [Bull AUE.]

  10   12   [No. of forage sources and time periods.]

        12 1 2 3 4 5 6 7 8 9 10 11 12
[BLM no. of time periods and monthly codes.]

 S   [Seasonal option for BLM.]

NO   [Default option for BLM seasons.]

   905   344   192   106   [BLM upper bounds.]

```
FEDSP     3   4   5   6           304       [Forage source names, no. of
FEDSU     3   7   8   9           628        time periods, time period
FEDWI     5   1   2   3  11  12        253   codes, and upper bounds.]
AFTER     3  10  11  12           277
LEASE     7   5   6   7   8   9  10  11      75
RANGEYL   9   1   2   3   7   8   9  10  11  12       191
RANGESP   3   5   6   7            64
PASTSP    1   6           435
PASTSU    5   7   8   9  10  11        2173
```

YES   [Hay default option.]

   3.33   [AUMs per ton.]

```
              7  1  2  3  4  5  11  12        [Hay time periods and codes.]

      2                        [No. of hay sources.]

GROW          530.0      530.0           [Hay source names, expected tons, and
BUY            0.       9999.0                upper bounds.]

      2    1                    [No. of labor sources and time units.]

        6028                    [Livestock labor hours.]

FAMILY       1  1                        [Labor source names, no. of time periods and
HIRED        1  1                            time period codes.]

YES                            [Upper bound option for labor source "family".]

   2697                        [Labor source "family" upper bound in hours.]

NO                             [Upper bound option for labor source "hired".]

     465.0                     [Hcalf weight.]
     465.0                     [Scalf weight.]
     465.0                     [Hyrlng weight.]
     465.0                     [Syrlng weight.]
     948.0                     [Cow weight.]

YES                            [Hay source "grow" labor option.]

    1536.0                     [Labor hours for hay source "grow".]

NO                             [Hay source "buy" labor option.]

     1.86                      [BLM cost.]
     1.86                      [FEDSP cost.]
     1.86                      [FEDSU cost.]
     1.86                      [FEDWI cost.]
     0.                        [AFTER cost.]
     6.80                      [LEASE cost.]
     0.                        [RANGEYL cost.]
     0.                        [RANGESP cost.]
     0.                        [PASTSP cost.]
     0.                        [PASTSU cost.]
     0.                        [Hay feeding cost.]
    35.00                      [Hay source "grow" cost.]
    88.00                      [Hay source "buy" cost.]
     0.                        [Labor source "family" cost.]
     5.00                      [Labor source "hired" cost.]
    62.00                      [Hcalf price.]
    62.00                      [Scalf price.]
    62.00                      [Hyrlng price.]
    62.00                      [Syrlng price.]
    38.00                      [Cull cow price.]
    62.00                      [Variable cost per cow.]
```

*A121/JUDY/XCHANGE

ENTER FILE NAME FOR MIXED-MODEL INPUT DATA
=WALKCSO

DO YOU WANT TO SEE THE MENU? (YES OR NO)
=YES

MENU OF DATA CHANGES

    0   PROBLEM NAME
    1   NO. OF BLM TIME PERIODS AND TIME PERIOD CODES
    2   BLM TIME PERIODS FOR EACH (REDEFINED) GRAZING SEASON,
            AND UPPER BOUND IN AUMS
    3   BLM UPPER BOUNDS FOR EACH (STANDARD) SEASON, IN AUMS
            OR ANNUAL BLM UPPER BOUND, IN AUMS
            OR MONTHLY BLM UPPER BOUNDS, IN AUMS
    4   FORAGE SOURCE NAME,NO. OF TIME PERIODS,TIME PERIOD CODES,
            AND UPPER BOUND IN AUMS
    5   AUM VALUE OF HAY
    6   NO. OF HAY FEED TIME PERIODS AND TIME PERIOD CODES
    7   HAY SOURCE NAME,EXPECTED NO. OF TONS, AND UPPER BOUND IN TONS
    8   CURRENT TOTAL LABOR HOURS
    9   LABOR SOURCE NAME,NO. OF TIME PERIODS, AND TIME PERIOD CODES
    10   LABOR SOURCE NAME UPPER BOUNDS, IN HRS
    11   WEIGHT OF LIVESTOCK PRODUCTS, IN LBS
    12   EXPECTED HRS OF CROP LABOR FOR HAY SOURCES
    13   FORAGE SOURCE NAME AND COST, IN $/AUM
    14   LABOR SOURCE NAME AND COST, IN $/HR
    15   LIVESTOCK PRODUCT NAME AND PRICE, IN $/CWT
    16   NON-LABOR COST OF FEEDING HAY, IN $/AUM
    17   HAY SOURCE NAME AND COST, IN $/TON
    18   VARIABLE COST OF LIVESTOCK OPERATION, IN $/COW OR EWE

ENTER THE TYPE OF DATA CHANGE YOU WANT TO MAKE
=1

ENTER NO. OF BLM TIME PERIODS AND TIME PERIOD CODES
=10,1,2,3,6,7,8,9,10,11,12   [This entry reduces BLM grazing to ten
                                         months, eliminating April and May.]

ANY MORE CHANGES? (YES OR NO)
=YES

DO YOU WANT TO SEE THE MENU? (YES OR NO)
=NO

ENTER THE TYPE OF DATA CHANGE YOU WANT TO MAKE
=3

ENTER UPPER BOUNDS IN AUMS FOR WINTER,SPRING,SUMMER,AND FALL
=905,115,192,106   [This entry reduces the number of BLM
                                         AUMs available in spring from 344 in
                                         the base run to 115 in this run.]

```
ANY MORE CHANGES? (YES OR NO)
=YES

ENTER PROBLEM NAME
=WALKER RESOURCE AREA CATTLE RANCH SAMPLE IMPACT RUN

ANY MORE CHANGES (YES OR NO)
=NO

ENTER FILE NAME FOR DATA FILE WITH CHANGES
=WALKCCH1


*A121/JUDY/XRANCHLP

RANCH BUDGET MIXED L.P. MODEL

IF INPUT DATA ARE ON FILE ENTER FILE NAME;
ELSE PRESS THE CARRIAGE RETURN KEY
=WALKCCH1

DO YOU WANT TO SEE THE COMPUTED MATRIX COEFFICIENTS
FOR THE 'AU' AND 'HAY SOURCES' COLUMNS? (YES OR NO)
=NO

DO YOU WANT TO ENTER LOWER BOUNDS FOR HAY SOURCES? (YES OR NO)
=YES

ENTER LOWER BOUND , IN TONS, FOR HAY SOURCE GROW
=430

ENTER LOWER BOUND , IN TONS, FOR HAY SOURCE BUY
=0

SNUMB 1918T
1918T -01   WAIT-PERIP    @ 09.593
1918T -01   EXECUTING     @ 09.593.
1918T -01   TERMINATING   @ 09.604
1918T OUTPUT WAITING     ID=K,. @ 09.604
normal termination

JOUT INVOKED.
function?RELE

WALKER RESOURCE AREA CATTLE RANCH MODEL - 1982

DO YOU WANT TO SEE THE INPUT DATA? (YES OR NO)
=NO
```

48

OPTIMUM PROFIT = $ 37542.25

VARIABLE		UNITS	X-VALUE	SHADOW PRICE	O.F. COEFF.	LBOUND	UBOUND
BLM	1	AUMS	319.277	0.	-1.860		
BLM	2	AUMS	0.	0.	-1.860		
BLM	3	AUMS	585.723	0.	-1.860		
BLM	6	AUMS	115.000	0.	-1.860		
BLM	7	AUMS	0.	0.	-1.860		
BLM	8	AUMS	192.000	0.	-1.860		
BLM	9	AUMS	0.	0.	-1.860		
BLM	10	AUMS	0.	0.	-1.860		
BLM	11	AUMS	0.	0.	-1.860		
BLM	12	AUMS	106.000	0.	-1.860		
FEDSP	4	AUMS	0.	0.	-1.860		
FEDSP	5	AUMS	304.000	0.	-1.860		
FEDSP	6	AUMS	0.	0.	-1.860		
FEDSU	7	AUMS	29.019	0.	-1.860		
FEDSU	8	AUMS	0.	0.	-1.860		
FEDSU	9	AUMS	598.981	0.	-1.860		
FEDWI	1	AUMS	253.000	0.	-1.860		
FEDWI	2	AUMS	0.	0.	-1.860		
FEDWI	3	AUMS	0.	0.	-1.860		
FEDWI	11	AUMS	0.	0.	-1.860		
FEDWI	12	AUMS	0.	0.	-1.860		
AFTER	10	AUMS	0.	0.	0.		
AFTER	11	AUMS	0.	0.	0.		
AFTER	12	AUMS	277.000	0.	0.		
LEASE	5	AUMS	75.000	0.	-6.800		
LEASE	6	AUMS	0.	0.	-6.800		
LEASE	7	AUMS	0.	0.	-6.800		
LEASE	8	AUMS	0.	0.	-6.800		
LEASE	9	AUMS	0.	0.	-6.800		
LEASE	10	AUMS	0.	0.	-6.800		
LEASE	11	AUMS	0.	0.	-6.800		
RANGEYL	1	AUMS	13.446	0.	0.		
RANGEYL	2	AUMS	154.455	0.	0.		
RANGEYL	3	AUMS	0.	0.	0.		
RANGEYL	7	AUMS	0.	0.	0.		
RANGEYL	8	AUMS	0.	0.	0.		
RANGEYL	9	AUMS	0.	0.	0.		
RANGEYL	10	AUMS	23.099	0.	0.		
RANGEYL	11	AUMS	0.	0.	0.		
RANGEYL	12	AUMS	0.	0.	0.		
RANGESP	5	AUMS	15.019	0.	0.		
RANGESP	6	AUMS	48.981	0.	0.		
RANGESP	7	AUMS	0.	0.	0.		
PASTSP	6	AUMS	435.000	0.	0.		
PASTSU	7	AUMS	569.962	0.	0.		
PASTSU	8	AUMS	406.981	0.	0.		
PASTSU	9	AUMS	0.	0.	0.		
PASTSU	10	AUMS	575.882	0.	0.		
PASTSU	11	AUMS	620.175	0.	0.		

ROW		UNITS	L-VALUE	MARGINAL VALUE	RHS		
HAYFEED	1	AUMS	0.	0.	0.		
HAYFEED	2	AUMS	431.269	0.	0.		
HAYFEED	3	AUMS	0.	0.	0.		
HAYFEED	4	AUMS	585.723	0.	0.		
HAYFEED	5	AUMS	204.962	0.	0.		
HAYFEED	11	AUMS	0.	0.	0.		
HAYFEED	12	AUMS	209.946	0.	0.		
GROW		AUMS	1431.900	7.798	-10.510	1432.	1765.
BUY		AUMS	0.	19.363	-26.426	0.	33297.
FAMILY	1	HRS	2697.000	-5.000	0.		2697.
HIRED	1	HRS	4165.777	0.	-5.000		9999.
HCALVES		CWT	632.577	0.	62.000		
SCALVES		CWT	866.515	0.	62.000		
HYRLNGS		CWT	0.	0.	62.000		
SYRLNGS		CWT	0.	0.	62.000		
CULLCOWS		CWT	397.499	0.	38.000		
COWS		AU	475.193	0.	-62.000		

ROW		UNITS	L-VALUE	MARGINAL VALUE	RHS
BLM	WIN	AUMS	0.	5.204	905.000
BLM	SPR	AUMS	0.	5.204	115.000
BLM	SUM	AUMS	0.	5.204	192.000
BLM	FLL	AUMS	0.	5.204	106.000
FEDSP		AUMS	0.	5.204	304.000
FEDSU		AUMS	0.	5.204	628.000
FEDWI		AUMS	0.	5.204	253.000
AFTER		AUMS	0.	7.064	277.000
LEASE		AUMS	0.	0.264	75.000
RANGEYL		AUMS	0.	7.064	191.000
RANGESP		AUMS	0.	7.064	64.000
PASTSP		AUMS	0.	7.064	435.000
PASTSU		AUMS	0.	7.064	2173.000

ACTUAL COWS/NOMINAL COWS RATIO = 0.93

BUDGET SUMMARY FOR WALKER RESOURCE AREA CATTLE RANCH MODEL - 1982
FOR HERD OF   475.19 COWS

LIVESTOCK	CWT	$/CWT	SALES,$
HCALVES	632.577	62.00	39219.79
SCALVES	866.515	62.00	53723.92
HYRLNGS	0.	62.00	0.
SYRLNGS	0.	62.00	0.
CULLCOWS	397.499	38.00	15104.97

GROSS REVENUE	108048.68
VARIABLE COSTS	
FEED	5165.58
HAY MGT	15049.98
LABOR	20828.88
OTHER	29461.98
TOTAL VARIABLE COSTS	70506.43
NET ABOVE VARIABLE COSTS	37542.25

[A comparison of this budget summary with the budget summary for the cattle ranch base run indicates a net impact of -$1192 in net revenue. Changes in other variables should also be analyzed.]

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